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"Salvation of India lies in Cottages."

—*MAHATMA GANDHI*

CHARACTER AND QUALITY

IT is greatly to be deplored that there has been precipitate fall in the character and intellectual honesty of the people since the attainment of freedom. Freedom was expected to create conditions for the elevation of character among the people. It was unthinkable in pre-independence days that hypocrisy, sycophancy, bluff, untruthful behaviour and false propaganda will be the common feature of our national life in the post-independent period.

But the weakness of action and administrative experience among the Congress rulers and their love of power and cheap publicity strayed them from the path of high moral code of conduct prescribed to them by the Father of the Nation. In their anxiety to retain power at all cost they adopted and encouraged unscrupulous means and methods regardless of moral considerations. Disregard of moral values by the ruling party has naturally undermined the moral basis of the society.

In the course of our talk with the late Shri Dev Das Gandhi, some years back, he expressed his horror at the loss of character among our people after we have become free. Freedom accompanied with moral bankruptcy is the greatest headache to every sane and honest thinking people in the country today. Obviously, such people are not enthused by the rosy pictures of national development presented and publicised by the ruling authorities day-in and day-out. They believe that no strong and enduring edifice of national development could be built without strong basis of character of the people. Nothing, including the utopia of "Welfare State" and "Economic Heaven", which our rulers are out to build through successive plans and various development schemes, provides guarantee of their success against adverse conditions or a crisis in national affairs whether economic or political save the character of the people.

It is rather tragic that this basic fact of enduring national stability is being mostly overlooked by the ruling class. And that presents a real danger to our infant democracy. Reviewing the last 10 years of Independence, 'The Times of India' in its issue of August 15th editorially writes on the state of affairs obtaining in the country :—

" It is not India's people who have failed her but India's rulers. The sycophancy which afflicts Delhi, paralysing mind and numbing wills, has infected the entire political and administrative atmosphere of our country. Posterity will hold to blame those who having the opportunity to speak their minds were afraid to do so lest their own interests be affected or injured. They are the guilty men.

"Delhi has converted the country into a babel of slogans which have mesmerised both the public and the politicians to the point of believing that the

country can be carried forward on the mere momentum of these empty shibboleths."

Moral basis of the society was probably never so weak in this country as it is today after 10 years of independence. And it has been mostly due to the policy of "Secularism" adopted by the State, which has inevitably tended to weaken the hold of religion on the minds of people and the rule of the country by unscrupulous political adventurers whose actions and behaviour have largely eroded the morals of the people.

The travesty of the situation is that the ruling class in its intoxication of power refuses to look at the realities and minimises the dangers that threaten the foundations of democracy in this country. Not knowing their own minds and oblivious of public weal they do not seem to be perturbed by the dangerous developments taking place in the country. The national scene which is full of grave implications has been portrayed by Shri Mulk Raj Anand in his letter to the 'Times of India' of the 15th August, a portion of which reads :—

"The threatened failure of the Five-Year Plan through the non-availability of adequate finance and the incidence of all kinds of strange taxes seems to have disturbed thinking people. And the talk of strikes for higher wages in the face of rising cost of living, followed by the issue of an ordinance, introducing a vital conflict at a time when the unity of purpose among the whole nation is necessary. The intelligentsia is confused and because of its inability to exercise any influence on the Government or public opinion, it complains about bureaucratic inefficiencies and corruption, the more orthodox having found a scapegoat in the Rosselini affair.

"The fact is that there is a lack, which had been apparent to one even before the elections and throughout the linguistic agitation, of a dynamic which may give the people the will to pursue the Five-Year Plan (that will make the difference between survival and disintegration) together, and to the end, by accepting all the sacrifices inevitable in the transition.

"Not all the publicity of the Government of India seems to have inspired the people into adopting the plan as their own. The parties of the opposition, though accepting the policy of the plan think of it as a plan of the ruling party and seek to corrode its foundations wherever they can, and certainly do not seem to help it to go forward. The ruling party, though accepting socialism, seems to be divided about the content of this pattern, in thought and action. And where there should be a Government of national unity, with the best brains of the country engaged in a positive programme of construction, there is being pursued the familiar game of power politics in view of the problem of succession".

The malaise that has set in the affairs of the country due to loss of moral values is corroding the very foundations of 'Welfare State' our rulers are out to build. It is almost impossible to find honesty and integrity in the character of any section of people and widespread corruption in all walks of life is its inevitable sequence. To what extent this corruption is rampant among all sections of the people in the present life of the country has been graphically presented by a corrospondent of the 'Times' in its issue of August 18th. which says :—

"The success of a Welfare State depends on the honesty and integrity of the people who handle public funds for public welfare. The colossal tax evasions, huge waste of public money and the widespread illicit tolls claimed by administrators, keepers of law and order, traders, landlords, middlemen, engineers and contractors not only sabotage our lofty efforts to build a Welfare State but even our infant democracy".

Progressive deterioration in efficiency and quality of work both in administrative and other spheres of national life is the natural corollary of loss of character among the people. There is a variety of baffling problems the nation is confronted with and the solution of these does not lie anywhere but in building up the character of the people. Lack of character is at the root of all evils raising their head and creating widespread confusion and distress in the country.

And this has been largely encouraged by our rulers who have set the fashion of talking in a big way and acting just the

opposite way. Not till this gulf between their professions and actions is bridged by the rulers through rigorous self-imposed discipline will the country be saved of the anarchic conditions and worse that are to follow. Will our rulers feel the responsibility of building national character through their personal example which is the basic factor of building the Nation and which they have allowed to deteriorate all these years of Independence ?

REFLECTIONS ON CO-OPERATIVE FARMING

By : **N. A. MUJUMDAR**

"THERE is a general agreement that Co-operative farming should be developed as rapidly as possible". That is how the discussion on co-operative farming begins in the Second Plan.[1] Though, therefore, the practical achievements in this field are admittedly meagre, the plan lays down that the main task during the second five-year plan is to take such essential steps as will provide sound conditions for the development" of co-operative farming, so that over a period of 10 years or so a substantial proportion of agricultural lands are cultivated on co-operative lines.

Recent Controversy

Since these remarks were made in 1956 much controversy has raged around the question of co-operative farming and to-day, as every one who has kept himself abreast of recent literature is aware, there is no "general agreement that co-operative farming should be developed "as rapidly as possible". Perhaps this rethinking on the issue and therefore the consequent debate stemmed directly from the Krishnappa Committee Report on Agricultural Planning and Techniques in China.[2] Agricultural conditions in India and China are similar in several ways — a dense population, relative scarcity of arable land and capital, plentiful labour, small size of farms etc. How then is China able to produce on 272 million acres of land almost twice as much food per head of population of 60 crores than has been found possible in India, with a population of 36 crores and 302 million acres of cultivated land ? It is to study the schemes and programmes which the Chinese authorities are adopting for increasing the productivity of their agriculture that the Government of India had sent this delegation.

The Report of the delegation pointed out that the organisation of Co-operative farms is the lynch-pin of agricultural planning and development in China. The delegation was impressed by the "surging tide of agricultural co-operation" which has swept the entire rural China today. By the end of May 1956, for example, 10,010,000 agricultural co-operatives have been established which included 91.2% of the 110 million rural households. Obviously impressed by this phenomenal development the delegation recommended that a policy of co-operativisation be also pursued in India.

To make an intensive study of this aspect exclusively, the Government of India sent another delegation which reported recently.[3] It is this Patil Committee Report which has set into motio

1. Second FiveY-ear Plan, Government of India' P. 201.
2. Report of the Indian Delegation to China on Agricultural Planning and Techniques, Government of India.
3. Report of the Indian Delegation to China Agrarian Co-operatives.

a series of arguments and counter-arguments for and against co-operative farming. The main bone of contention is the degree of voluntariness involved in the organisation of co-operatives in China. While the majority of the delegation is at pains to prove that the developments in the field of co-operation in China have been achieved with the willing and voluntary co-operation of the people, two members of the delegation who append a minute of dissent to the Report, seek to establish that the whole structure of movement was imposed on the people from above and that this process of development has been achieved through a degree of force and violence. Around this degree of voluntariness with which co-operativisation has been brought about in China the present controversy centres. To add to this is a recent Report of the Indian Co-operative Union which advances a number of socio-economic and political reasons to caution the country against unthinking enthusiam for agricultural co-operation.[4] The report provides some evidence about the impracticability of joint farming in regard to the co-operative farming Societies started in India in the last few years. Coming as it does, from an institution which itself has been promoting co-operative farming in India, this report has naturally set the planners rethinking on the issue.

Basic Factors in Agrarian Structure

Such controversies are no doubt welcome in so far as they provide an opportunity to judge the pros and cons of the issue. It would be unfortunate, however, if they tend to cloud the main issue involved, in an over-zealous attempt to discuss what is merely a side-issue. Again the basic factors in agrarian structure of India, against which, in fact the views should be projected, are not always appreciated. It, therefore, becomes necessary to re-emphasise certain basic features of our agrarian economy.

Agriculture in our country is carried on by independent, small farmers on their tiny and fragmented holdings. The recent Agricultural Labour Enquiry has revealed that, taking India as a whole, the cultivators' holdings below one acre formed 17 percent; those between 1 and $2\frac{1}{2}$ acres about 21 percent and those between $2\frac{1}{2}$ and 5 acres another 21 per cent. Even assuming 5 acres to constitute an economic holding,–in some areas it would be substantially larger – about 60 percent of the farmers cultivate holdings smaller than that. The conclusion is very clear. In any progressive plan of developing agriculture it is futile to consider these cultivators as independent units of land exploitation. The basic condition for increase in agricultural production or for that matter for the adoption of progressive agricultural practices in general, is increase in the unit of management of land. We may go to a step further and say that the salvation of agricultural poverty lies in increasing the size of cultivated holdings.

Two Alternatives

It is against this basic factor that the merit of any programme of agrarian reorganisation has to be judged. Broadly visualised two alternatives offer themselves. One way of solving this problem would be to undertake a comprehensive scheme of regrouping of all holdings in such a way as to ensure an economic holding for each cultivator settled on land. An envitable result of such a drastic measure would be the displacement of a sizeable proportion of "surplus labour" in agriculture. Hence designing of employment-programmes for the labour so displaced should precede the rational layout of land. Evidently such

4. Co-operative Farming–Raj Krishna and others, Indian Co-operative Union, Delhi.

India. There are, however a good number of I. C. A. R. and other publications which supply the necessary information regarding many breeds of all India importance, but still a gap is found for literature on systematic study of the problem. Minor breeds have generally been ignored, may be that they could not be taken up due to lack of space in most of the journals.

It is therefore attempted here with this first instalment of zonal survey to incorporate details of historical background, effect of climate, habits, performance and characteristics of the major and minor breeds in each zone (after states' reorganisation) of India. As a precaution it has been kept in mind throughout that no exaggeration of any point is made to confuse the reader. Most of the matter has been compiled from: (a) Zebu Cattle of India and Pakistan—F. A. O. 1953, (b) A brief survey of some of the important breeds of cattle in India -1940, and (c) Definition and characteristics of seven breeds of cattle of all India importance- 1950, both I. C. A. R. publications, (d) Report on the marketing of cattle in India -1946, and, (e) A Hand book of Animal Husbandry and Dairying by V. T. S. Mudaliar- 1956.

Cattle of South Zone-Cows

Indian cattle belong to the type Bos-indicus and the buffaloes to Bos-bubalis. These cattle (cows and buffaloes) are distributed all over the country in different types of soils, climate and vegetation. These latter factors have directly contributed to the physical and characteristic standards of the cows and buffaloes. In the recent times, groups of cattle of the different areas, exhibiting similar characteristics—mainly the colour, usefulness, body size and milk yield, have been classified under various categories and these categories in many cases have been so well defined that many breeds have been established. Historical records can be cited to explain the reasons for the presence of similar characteristics between two different breeds from distant areas which are due to the fact that some classes of cattle owners (nomadic and semi nomadic tribes) have for long been responsible for shifting cattle of one area to another and gradually concentrating on these cattle their breeding policies.

Many cattle from the remote north were shifted to the south and after much of labour could be made to survive under the changed conditions of climate and vegetation. As a result, the cattle of south, to-day, are not purely of south but significantly of the north also and vice-versa, depending however more on the directions to which the tribes moved in the past.

The south zone cattle are generally found lacking in milk quality. But they easily surpass the cattle from other zones in power of endurance and stamina. This peculiarity can be explained on the basis that the south has a different type of soil and climate and grows mainly rice and millets as the chief source of nourishment for human beings as well as cattle, whereas the north grows wheat, rice and millets for the same use.

There are nine major and minor breeds of cattle in south zone, namely, Kangayam, Ongole, Alambadi, Hallikar, Hagalavadi, Chitaldrug, Amrit Mahal, Pullikulam, or, Jellicut and Tanjore polled cattle. A short summary on the full details of these breeds is given below :—

1. **Kangayam**—This breed confirms largely to the Mysore type of south Indian cattle. In its native area it is also known as Kanganad and Kongu and is popularly known as Kangayam. Kangayam cattle are bred in southern part of Coimbatore district. The breed is found in its pure form in the herds of Pattagar of Palayakotti. The Kangayam breeding area is bounded by hills of Nilgiri and Anaimalai to the west and south. River Cauvery runs along the eastern border. The soil is red loam full of canker and gravel and mostly shallow. It has a calcareous substrata and can grow good pastures. The area has a very favourable climate as the winter is mild and summer is tolerably hot. Rainfall is spread throughout the year and this spread of rains gives abundant scope to grow pastures.

The crops grown in the area are Bajra, groundnut, cotton, sugarcane and Arhar.

The Kangayam cattle are mostly kept in open fenced fields. The calf is allowed to suck its full requirement from the mother generally for the first six weeks and later on as it starts feeding on stuffy matter, the quantity of milk is reduced to zero. Male calves are weaned later than female calves. The young bulls are castrated at the age of 2 to 3 years and also broken for light work soon after castration.

Physical and functional characteristics: Kangayams are strong and active animals with compact bodies and short stout legs with strong hooves. The horns are long and curve outwards and backwards and almost complete a circle at the point where they approach the tips. The head is of moderate size with slightly prominent forehead. The ears are small, erect and pointed. The eyes are dark with black rings around them. They have a short neck which is thick and the back is broad, short and level. The colour is generally grey or white; the males are generally grey with dark black grey colouring on the head, neck, hump and quarters. Cows are white and grey with deep marking on knees. Benjamin and Raju (1949) have observed that the coat colour in Kangayam changes. An average mature bull weighs 1200 lbs.

Kangayam cattle are highly prized draft animals but are poor milkers. The average yield of the foundation cow at the Live Stock Research Station, Cattle Farm Hosur is given as 1493 pounds with a daily average of 6.2 lbs. The calf at birth weighs 44 lbs. on an average. The bullocks are very hardy and perform good duty for 8 to 10 hours daily and serve a period of 10 to 12 years. Bullocks are generally sold to the cultivators of black cotton soil area of the south.

2. Ongole—Ongole breed is also known as Nellore and these very names indicate that they are derived from the areas in Ongole and Nellore districts where they are found. Ongole cattle have great similarity to the Gaolo breed of Madhya Pradesh in central zone and also slightly to the Bhagnari cattle of north zone. This similarity is explained in the light that these animals were taken by Rig Vedic Aryans in their march from north to the south. The best specimens of this breed are found in Guntur and Nellore districts of Madras state and the area extends over to the districts of Kistna, Guntur, Nellore and parts of Vizagapatnam. On the east of this area lies the Bay of Bengal and its north is bounded by the river Krishna. This tract is mostly flat with hills to its western side. Soils towards the sea coast are alluvial and of good quality. Towards north is the black cotton soil area which contains good quantities of lime. The climate of the area is dry and mild. Average rainfall for the tract is 30-35 inches annually. The drier portion of this tract grows mostly oil seeds and cotton and thus oil cakes and cotton seed are available for feeding the cattle.

Physical and functional characteristics: Ongole cattle are efficient for both work and milk. The bullocks are very powerful and suitable for heavy plough or cart work, but are generally not very useful for speedy jobs. The cows are average good milkers. The milk yield in well maintained herds averages 3526 pounds per lactation while individuals have reached 7910 lbs. mark.

These cattle are large and heavy type. Mature males weigh 1200 to 1500 pounds and females 950 to 1000 pounds. They have a long body and short neck, and muscular and long limbs. The general appearance is alert, but docile with good carriage and gait. The popular colour is white and the males have grey markings on head, neck, and hump and black points on the knees and on the pasterns of both the fore and hind legs. The udder is broad and extends well forward and high up between the hind pair of legs. The quarters are even and of moderate size. Horns are short and stumpy growing outwards and backwards, thick at the base and firm without cracks.

Due to their useful qualities Ongole cattle were exported to tropical America and other countries and were mated with the local stocks there.

3. Alambadi—It is a minor draft breed and resembles Mysore type cattle. The breed derives its name from the village Alambadi in Bhavani Taluk of Coimbatore district where the animals are assembled for sale. They are also known as Lambadi, Salems and Cauvery breed. The breeding of these animals is confined to parts of

Bhavani, Kollegal, Hosur and Dharmapuri Taluks.

The animals are good for draft and although they resemble the Mysore type to an extent, yet they do not come up to the same standard in many ways. The loose framed cows have a fold of skin forming the navel flap similar to Ongole cows. The cows are commonly used for farm work in the tract, as the bull calves are sold off at an early stage and the stock of the bullocks is limited. The young male calves are weaned and sold before they are a year old. Breeding bulls are kept in the forests along with cows.

4. Hallikar—It is an important breed of the Mysore type of south Indian cattle. It is evident from old records that Hallikar herds were being maintained between 1572 and 1600 A.D. Hallikars are mainly bred in Tumkur, Hassan and Mysore districts. Apart from this area some herds are also being maintained in Dharwar district in Mysore State where they go by the name Amrit Mahal on account of their originating from the Amrit Mahal herds of the state establishment.

The tract where the Hallikars are bred is undulating with an average altitude of 2500 feet above sea level. The hilly area is locally known as Malnad. The principal rivers which run through the area are Cauvery and Hemavati. In west and south there are extensive pastures while the east is intensely cultivated. The climate of the area is equable and temperatures are moderate. The area grows mostly oil seeds and pulses and also castor. In areas where irrigation is available plantains, sugar-cane and other garden crops are grown. Pasture areas are preserved by the Government for the grazing of cattle.

Physical and functional characteristics—Hallikar cattle are medium sized, compact, and muscular in appearance. The difference between cows and bulls in size and build is not so well marked as in other breeds, for the cows have a muscular and masculine appearance. The fore-head is prominent giving a slight bulgy appearance and tapers towards the muzzle which is usually black in colour. Horns emerge near each other from the top of the poll and are carried backwards each in a straight line for nearly half their length and then with a gentle and graceful sweep bend forwards usually lightly reclining inwards towards their points which are usually black tipped and short. Eyes are small, clear, and intelligent and in some cases blood shot. Ears are small tapering to a point. The neck is long, thin for the size of cattle. Hallikars are grey to dark grey with deep shadings on the fore and hind quarters. They are one of the best allround draft types available in south India. Thirty to forty miles a day on rough roads is a common day's work. The cows are generally poor milkers and they are rarely milked. Reports from Live-stock Research Station, Cattle Farm Hosur, show that 69 cows averaged 3.5 pounds of over-all daily yield after allowing milk for the calves.

The breed has spread into Dharwar dissrict in Mysore State. It is estimated that there are about 17,94,000 cattle of the Hallikar breed.

5. Hagalavadi, and 6. Chitaldrug.—Three sub-varieties of the Mysore breed of cattle are recognised. They are Hallikars, Hagalavadi and Chitaldrug. Their general characteristics are more or less the same with minor differences caused by changes in local environment. Of the three, Hallikar has for long been recognised as a major breed and the rest as minors. Some workers are of the view that they are not separate breeds whereas others contradict this view. According to Mudaliar (1956), it is believed that the three sub-breeds lost their originality and got considerably mixed up when herds of Tipu Sultan were disbanded after his fall. The sub-breeds were reformed later and now constitute the Mysore Breed. Hagalavadi and Chitaldrug are found in the areas of Hallikar breed. Mudaliar gives the following characteristics of the Mysore breed of cattle :

(a) The head in moderately long with bulged forehead.

(b) The ears are long and the horns erect and long with a backward graceful sweep.

(c) The neck is thin and wiry surmounted by a big hump.

(d) The dewlap is thin and small and extends upto the sternum.

(e) The body is deep and compact with well sprung ribs.

(f) The back is fairly long and rises lightly near croup.

(g) The hind quarters are narrow and slope from the croup to the tail.

(h) The sheath is tight and adheres to the body closely.

(i) The tail is long and tapering.

(j) The legs are of moderate length, strong and thin and the feet are small, hard and black.

(k) The colour is iron grey or grey.

(l) The hair are fine and skin is dark.

Most of the characteristics confirm to the description given in the case of Hallikar, separately.

7. **Amrit Mahal**—As has already been mentioned elsewhere, the Amrit Mahal cattle belong to Mysore family of cattle, and have been so named on account of their having spread up to Dharwar district where they belong to the Amrit Mahal (house of milk) herds of the state establishment. It should therefore be kept in mind that Amrit Mahal cattle are not an original breed but a modified form of Hallikar cattle of Mysore. They are also found in northern part of Andhra State.

The home of Amrit Mahal is in the Mysore State. These cattle are owned by well-to-do cultivators and large breeders who maintain herds in the vicinity of hills where ample grazing is available. These breeders sell their calves when they are about 1 to 1½ year old to cultivators who raise them for farm operations and also for sale in cattle fairs.

Physical and Functional characteristics.—The most striking point of these cattle is the formation of head and horns. The head is well shaped, long and tapering towards the muzzle. The fore-head bulges out slightly and is narrow, and, furrowed in the middle. The neck is strong and fairly long. The back is level with broad loins and level rump. Legs are medium sized and well proportioned. The skin is thin, mellow and jet black in colour with short glassy hair. The colouring is usually with some shade of grey varying from almost white to nearly black and in some cases white grey markings of a definite pattern are present on the face and dewlap.

As these cattle are maintained in open pasture areas, they show a very impatient, wild and unruly disposition. They are in majority of cases dangerous to strangers. Once they are trained and well handled they make extremely fine bullocks and serve more efficiently for quick transportation on roads. Amrit Mahals are observed to have great endurance. The working life of the bullocks is generally 7 to 8 years. The cows are very poor milkers under ordinary conditions. In organised and well maintained herds they are reported to have yielded 6 to 9 pounds milk per day after feeding their calves.

8. **Pullikulam** or **Jellicut**—This breed is largely encountered in Madurai in southern areas and particularly in Cumbum valley and Periakulam Taluks. This breed resembles the Kangayam type in a general way but are smaller in size. Mudaliar (1956) mentions that they are hardy and trot well and a good number of bulls are raised for bull-baiting, which is a favourable pastime in the region. Good fighting bulls are highly valued. This is a minor breed.

9. **Tanjore polled Cattle.**—The bullocks in Tanjore district have no horns and therefore look very different from other cattle of south zone. This polled character is not inherited. Young bull calves are dehorned by applying red hot iron to the horn-buttons. The ears of the calves are also cut short and shaped to a point. People of the area believe that dehorning makes the animals stronger and docile. The Tanjore cattle are the only indigenous stock in south and resemble Kangayam breed in a general way but are smaller in size.

Buffaloes—Mudaliar states that buffaloes in south are of nondescript types and are more or less alike in general appearance. They are small compact animals, but those in Ganjam and Vishakhapatnam districts are bigger in size and are a distinct type called the Parlakimidi or the Kamidi type. They are good milkers giving about 8 pounds of milk per day with best specimen giving upto 20 pounds. The Toda buffaloes of Nilgiris are a distinct semi-wild type and yield fair quantities of milk. South Kanara buffaloes are of a fierce disposition and the bullocks are often used for competitive racing in swamp rice fields. Most of the better type animals seen in cities and suburban area in south zone are imported cattle from northern and western zones.

a country-wide programme of regrouping of holdings is beset with great social, economic, political and administrative difficulties. But unless this fundamental reform is carried out, other reforms, however beneficial they might be, are bound to prove as mere palliatives.

The other alternative is to organise the cultivators into co-operative farms. As we are directly dealing with this subject in this article let us consider its implications in detail.

Organisational Effort

When once we accept in principle the need for co-operative farming, the collossal organisational effort needed to usher into existence co-operative farms throughout the length and breadth of the country assumes paramount importance. Those who exert the Chinese experience, often forget this aspect of the programme. It would be no exaggeration to say that the story of the success of agricultural planning in China is the story of the drive and ability of the Communist Party of China which has 10.7 million well-organised, disciplined and hardworking members. It is the members of the party working in the remotest villages who have brought about fundamental changes in the rural structure of China within a short span of 7 years. Whether it is in implementing land reforms, or organising farmers into co-operatives, or harnessing the resources of the entire nation, it is the Communist Party and its cadres at all levels that has been the driving force behind. Apart from ideological considerations, the pertinent question in the context of Indian conditions is : Can any Party in India provide this driving force ?

Relevance of Voluntariness :

Those who indulge in controversies about the degree of voluntariness in co-operativisation in China side-track the main issue. Even accepting that there was some amount of force and violence in China, what of it ? Why should we in India literally follow their experience with all its evils ? Can we not devise ways and means of achieving their goals *without* their evils ? The more relevent question to which further thought needs to be given is not so much whether any force was applied in the process of co-operativisation in China, as whether co-operativisation on a similar scale can be undertaken in India without the use of compulsion. To a dispassionate observer it appears that this can be attempted in rural India.

In general the farmer in India has shown a remarkable ability to respond to changing conditions of technology and times. For instance, as the Krishnappa Committee itself points out, the crops in the best areas or in the best farms in India are no worse than those in the best areas and in the best farms in China. The operation of the Community Projects and the National Extension Service has conclusively shown that, if initiated and directed properly, the farmer is able to pick up the new things and adjust himself to the altered conditions. Characteristically enough, the age-old farming practices are yielding place to new methods and techniques, better seeds, improved implements, fertilisers etc., making their way to even the remotest villages.

This suggests a clue to the whole range of agrarian problems. What is sought to be emphasised is that given the opportunity, the ryot is certainly capable of adjusting himself to altered conditions. The crux of the problem is therefore to provide an organisational frame work comparable to that of the Chinese Communist Party which would encompass the entire countryside. Governmental administrative machinery can go only to a limited extent and no further. In fact, to a considerable extent, the failure of co-operative movement even in the sphere of credit can be attributed to an almost complete dependence on the administration for its development. To enthuse the rural population something more than a hoast of government officials is called forth. What is required is a band of constructive workers at all levels working with the same missionary zeal, devotion and drive of

the Communist party members in China. The *Bhoodan* movement has already demonstrated that India can provide such a team of workers. It would not be therefore difficult to bring into existence such an organisation devoted to push forward in the rural sector a plan of development conceived on sound *economic* principles.

Could such an organisation be created, it would certainly be possible to organise co-operative farming societies throughout the country, without resorting to compulsion or force. The point is that workers would move into the villages and explain, educate and cajole the cultivators to form themselves into co-operative farming societies.

Other Implications

Before concluding, it is necessary to point out certain other implications of co-operative farming, which is construed in a variety of ways by different persons. If the co-operative farming is to become really effective, mere pooling in of land for cultivation purposes may not be enough; it would be essential to remove surplus labour as well as surplus livestock from land. Otherwise, though total product might increase slightly, the average product per person may not be much higher, because it will have to be shared amongst the same number of persons. This redundance of labour has been an endemic disease of our land economy and adoption of co-operative farming makes explicit the disguised unemployment and thereby provides an opportunity to eradicate it. Whatever be the arguments on grounds of social equity, if one has to have a sense of realism, this fundamental fact has to be accepted. Any attempt to accomodate more people on the land, other conditions remaining the same, it should be firmly pointed out, is bound to result in further deterioration of the economic condition of the farmers. It would also affect adversely the rural economy in general. This certainly does not mean that the landless and the jobless should be allowed to go to the wall. Quite the contrary. To such persons and to those who will be displaced from agriculture, fresh avenues of employment will have to be explored and provided for, preferably in their home villages, at least in the initial stages. Schemes like the Ambar Charkha may play a useful role in this direction.

To sum up, if agriculture in India is to make any substantial progress it is imperative that the unit of operation be enlarged sizeably. If the problem of agrarian reorganisation is viewed from this perspective, there appear to be two alternatives to bring about the desired changes. One way of achieving the objective is for the Government to carry out a comprehensive and country-wide programme of regrouping of holdings with a view to providing each family settled on land some sort of an economic holding. This indeed is a drastic measure bristling with grave political, social and economic complexities and involving displacement of a considerable size of population from land. The other alternative is to organise co-operative farms throughout the country. This is possible of attainment, without resorting to compulsion, if a voluntary organisational machinery is created for the purpose. Governmental administrative machinery can hardly succeed in undertaking this huge and rather complicated task. Another implication which should not be overlooked is that if co-operative farming is to be fully effective, surplus labour will have to be removed from land and rehabilitated in suitably designed non-farm avocations.

MECHANISATION OF INDIAN AGRICULTURE

By : **PROF. J. S. UPPAL**

LIKE every workman the agriculturist also needs tools to carry on his agricultural operations. The majority of the Indian cultivators still use old and simple implements, which reduce the yield from land, add to the labour of the cultivator and in this way reduce his income. As against this, a distinguishing feature of Agriculture in USA, UK, Canada and Australia is the marked use of machinery and power for agricultural operations. In our scheme for Agricultural Development, we have to decide as to how far machinery and power can be used by Indian agriculturists.

The protagonists of mechanisation of Indian Agriculture assert that our economic backwardness is due to our using obsolete implements because they cannot produce food and raw material enough for our expanding population. It is said that through mechanisation it would be possible to resort to intensive cultivation and in this way every inch of land will be utilized towards more production. We are told that machines will remove the strain on human beings and a vast population will be able to move to non-agricultural sector, and thus there will be more production of goods and services. In this way it is sometimes suggested to attain balance in our economy.

Objectively speaking the aim of machanisation is to increase economic efficiency. Efficiency is measured by the ratio of output to input. The main inputs in agriculture are measured in the form of land, labour, and capital. In capital we include outlay on livestock, fertilizers, seeds, irrigation facilities etc. etc. All these items influence output, directly or indirectly by affecting land and labour. The last two also influence output directly. Let us find out how these are effected by mechanisation.

It still remains to be seen whether mechanisation in agriculture increases the output per unit of land or not. The lands which are highly infested with weeds give a better yield when tilled with high power driven machinery. On the other hand, as has been shown by recent experiments in England and Wales, mechanised farms being large farms, and the farming system being extensive, the yield per unit of land is lower than small farms where farming system is intensive. In India with the exception of lands which are infested with weeds, mechanisation does not affect the output per unit of land. No doubt, by utilising the high powered tractors and with the help of time and labour saving devices, we can do the work of many labourers, yet the fact is that the output per unit of capital is lowered since capital investment increases very much due to the use of costly machinery and increased expenditure in its running, maintenance, repair, depreciation and interest. In the circumstances, if the saving due to increase in efficiency of labour is less than the extra-expenditure incurred on running, maintenance, repair, depreciation and interest, mechanisation will not be a paying proposition.

It may be pointed out that mechanisation is advantageous only if some conditions e.g. scarcity of labour, high wage level and high economic standard etc. are satisfied. Moreover the people should be enterprising and mechanical minded. The success of mechanisation in countries like USA, UK, Argentina and even USSR is mainly due to these reasons.

In India these conditions are peculiar in themselves and they are not much

conducive to the mechanisation of agriculture. In the first instance, there is a great pressure of population on land and the use of machines will displace millions of our village population and the problem is there to find the employment for these displaced persons. The result will be addition to the already large army of unemployed persons in our country. Further, as said above, the success of mechanisation depends to a great extent on the technical efficiency of the machines. The machines that are available in India are mostly designed to suit the country of manufactures e.g. England, U.S.A., U.S.S.R etc., and therefore, fit in well with their crops, system of cropping and the environmental conditions. These machines are not useful on the different stages of different crops in different localities in India. In the circumstances to be efficient mechanically either such crops should be grown as fit in with the present machinery or cropping system and designing of the machines, should be so altered that crops, cropping system and the machines fit in with each other. To do this is not an easy task in backward economy like ours.

Another difficulty in the way of mechanisation is that the average size of our holding in India is very small. It is humorously said that the fields in India are even smaller than the size of the imported Tractors. This smallness of the fields militates against the use of Motor Tractors and other modern farm machinery. If we may decide to wait till our holdings are consolidated, we might have to wait for decades as it is not an easy job to consolidate all our fragmented holdings within a short period. In this connection, often there is an idea of introducing baby Tractors and equipment suitable for small holdings as in our country. But due to the small and fragmented holdings, the Indian cultivator depends on the manual labour for sowing inter-cultivation and harvesting of crops, he usually grows. Then again the manual labour on which he depends is not usually the hired one and hence there will be no saving from mechanisation.

The mechanisation will present to us another difficulty and that is of the huge cattle population to be displaced by the Tractors. We cannot suddenly cut down their number and especially due to the reason that India is a land of Hindus and their religion does not allow the killing of cattle.

In view of the difficulties explained above the wholesale adoption of mechanisation of our agriculture is simply out of question. There are however, certain operations and areas in which the use of Tractors has distinct advantages. Firstly there is the reclamation of waste and weed infested lands. The utility of power driven machines for reclamation operation has been demonstrated by the Central Tractor Organisation which has been working in the Tarai areas of the U. P. and Kans infested tracts of Madhya Pradesh, Madhya Bharat and Bhopal. Then come the cultivation of lands in sparsely populated areas where there is shortage of labour. While the pressure of population is generally heavy in the country as a whole there are thinly settled areas, particularly in Madhya Bharat, Vindya Pradesh, Rajasthan etc., where labour shortage is an important limiting factor in the expansion of cultivation and in these tracts, cultivation by Tractors has great advantages.

WHY HIGH FOOD PRICES ?

By : **G. B. SIRDESHPANDE**

THE question of high food prices has been baffling the Government. Being confused, the Central Food Ministry has appointed a Committee to inquire into the matter and suggest remedies to pull down the food price level. I put the same problem to a number of peasants pointing out the quantity theory of money and the increase of population as the main arguments advanced by our spokesmen—both official and experts. The peasants concede these points but not in the way our spokesmen have understood them.

The peasants say food prices have soared high this year, mainly because there has been complete failure of millet crop over a wide area of the Deccan–in fact from Madhya Pradesh to Bangalore including the former Hyderabad State. The actual yield is not even 10% of the normal. So, great shortage has been caused. Since the demand for food is inelastic, the prices have risen to a considerable height. If only the quantity theory of money were operating, the price level of all food crops should have been *equally* affected. But price level of rice and wheat has not had a steep rise as has happened in the case of Millets. The present high price of food crops will not be a permanent phase in our price index. Such changes did happen in the past and may recur in future. Our agricultural production has always been a gamble in rainfall and weather conditions. This year, there has been a wet famine a very unusual affair.

Real Factors

The peasants point out the real danger to food production in recent times has been the increase in money-crops—ground-nut, sugarcane and cotton—displacing the food crop of jowar, bajra and wheat. Ground-nut crop has practically ousted bajra and kharif jowar. Ground-nut being a hardy crop withstands the rigour of irregular rainfall and foul weather. The yield per acre is also considerable compared to millet crop. Sugarcane and cotton crops also being good money yielders have been displacing jowar and wheat. Of course, the agriculturist is the beneficiary in all this change. The society may be a sufferer. But the nation on the whole is a gainer: since more valuable crops are grown where smaller and cheaper crops were grown before. It is unwise from the National point of view to interfere in this changed agricultural practice.

The other contributing factor for food shortage is the increase in population. It is working unobtrusively not realised by many. A peasant pointed out that a decade back, the number of persons in his house were the same as they are now. But today, the consumption of food in his house has doubled though the number has remained the same. A decade back, his five children were from 12 years to 2 months. Now, their ages are from 22 to 10. Hence the food consumption has increased to double that of a decade back. What is happening in his family must be happening in most families. Though the increase in population per decade is from 10 to 12% in this country, the food consumption increases by leaps and bounds. It does not increase by only 10 to 12% as is popularly supposed. 40% of our d[illegible] occur in the age group of 0–5. Th[illegible] is: the food-consuming popul[illegible] tinues to increase. Conseq[illegible] food is required with the [illegible] decade. Our food pr[illegible] keeping pace with it[illegible]

problem which has not received due importance. Our food-problem should be examined from this point of view. Our food consumption is said to be increasing in geometrical progression while the population is increasing in Arithmetical progression.

Remedies.

Our food-problem will always remain a gamble in rainfall and weather-conditions. Nobody can effectively counteract them. We have to import food sometime or other. We need not be panicky about it. However, we may try to mitigate the rigour of the problem. Since rice is a steady and sure crop, we may encourage its increased production by supplying liberally the fertilisers to the growers. Since the quantity of rice required to satisfy hunger is half that of millets, millet consuming population be induced to take at least half the quantity of food in the form of rice. Thereby a lot of millet is economised for wider distribution. If rice is partly consumed by the exclusively millet eating population, the scarcity of millets will not be severely felt. Now-a-days rice is considered a luxury by the millet eating population. By real calculation, rice eating is cheaper and healthier to exclusively millet eating. A big propaganda is necessary in this respect. Since rice can be had cheaply from our neighbouring countries of Burmah and South East Asian countries in exchange for our surplus textiles, our food-problem will not be a head-ache to our Government as it has become today.

All these considerations do not absolve the Government from the responsibility to provide the sinews of production in the "Grow More Food Campaign". Peasants complain, a quarter of our lands has still remained weed infested. Subsidised tractor ploughing of such weed infested land is urgently calld for. Still good seeds are not available to the agriculturists at the time of sowing. Our peasants complain the Government Agencies are only show pieces. When the time comes for delivering the goods, they fail. When they deliver the help, they do so after the need is over and that too in a leisurely way. One is sick of such mishandling. "Our active politicians are brave fellows at the time of bridal procession but make wry faces when approached for supplying the necessaries of life by the very bride" said one funny peasant. Committees and Commissions offer no magic wand. Start giving needed help in growing more food. Empty talk achieves nothing. Advice must be backed up by fruit bearing action.

AGRICULTURAL PROPAGANDA AND RESEARCH EXTENSION WORK.

(PROGRAMME OF WORK)

By : **H. M. DESAI**

...he N. E. S. and C. D. Blocks ...e of improvement of all aspects ... is aimed at. The programme ...lopment can roughly be ...e following heads :—

...t programme which ... better amenities of life in the village e. g. setting up schools, providing libraries, roads, *community* buildings, drinking water, drainage etc.

(2) Enacting laws for land reform,

(3) Increasing agricultural production, and assuring better returns in farming

by developing co-operative activities including co-operative farming.

(4) Development of village and small scale industries.

(5) Welfare work.

(2) Of the rural development programme mentioned above it is proposed to discuss here item number 3 i. e. the programme for increasing the Agricultural production together with an increase in its money value.

For the purpose of this article let us examine the technical and organisational aspects of the programme.

(A) The technical aspect.

It includes :—

(1) Land and its improvement, use of water, better land use etc.

(2) Perfecting the technique of cultivation by the use of improved seeds, manures and fertilisers, composting, green manuring, use of improved implements, adoption of improved agricultural practice, better irrigation methods etc.

(3) Providing irrigation facilities by constructing canals, tanks, bored wells etc.

(4) Adoption of improved dry farming, irrigation, rotational harvesting, processing and other practices.

(5) Control of pests, diseases and eradication of pernicious weeds.

(6) Cattle improvement.

B. The Organisational aspect includes:-

(1) Co-operative joint farming.

(2) Co-operation in farming in its various aspects etc. e. g. joint purchase and sale. control of pests and diseases etc.

(3) Crop competition.

The above indicates the general programme of the agricultural extension work to be adopted in each tract according to its needs.

(4) It is proposed to discuss here only the technical aspect of the programme. Socio-economic aspect though equally important is left out of consideration in this article.

Results, of the working of the "Grow More Food Crops Campaign" for over a decade, were examined by a committee appointed by the Bombay Government in the year 1954–55. The committee carried out on the spot investigations and after examining the working of the campaign in the various districts of the State came to the conclusion that the results of the campaign were not satisfactory and the campaign should come to an end. It was also found that the intensive work for increasing production of food crops organised by the Agricultural Department by supplying to the farmers means and materials on the spot on easy terms had not fared any better. Very powerful campaign to introduce the Japanese method of paddy - cultivation in the various rice tracts of the country has also not proved to be a spectacular success.

Land improvement works. These works were in operation in the Deccan and the Karnatak areas in the Bombay State for a very long time. Anti-erosion bunding works in the past were undertaken by progressive farmers with the help of the experts from the Agriculture Department.

As a result of experience in the past it was realised that anti-erosion works in order to be successful must cover the whole of the water shed of the eroded area. These works were taken up on a large scale by the Government as a part of the programme of the Grow More Food Crops Campaign in the Deccan and Karnatak areas. As successful results were not obtained in the black soil areas a committee was appointed to investigate the reasons for the failure. After studying the whole question the committee suggested that a regular programme of research work should be

undertaken in order to find out methods for anti-erosion works that would yield enduring results in the black soils.

In the Gujrat areas lot of land is lying waste by the river banks awaiting development if suitable development methods for it are available. Government have recently started a research station on the bank of River Mahi in the Kaira district. Similarly lot of land is also lying waste due to salt infestation in the Gujrat areas awaiting development by suitable methods if only they are made available for the same. In short, schemes for land improvement and development of waste lands are beset by many and varied problems which await solution. What is needed is strong research programme to work out efficient and economically sound methods of land improvement and land development works which could be adopted on a general scale.

(5) Another question is that of perfecting technique of cultivation by the use of improved seeds. Improved seeds of some of the food crops are now available and are supplied to farmers under seed multiplication and distribution of improved seeds schemes. Under this scheme improved seeds are multiplied on Govt. farms in the first stage. The produce obtained on this farm is further distributed to selected farmers for further multiplication. The process goes on and in subsequent years there is further multiplication to the 5th or 6th stage. The produce from the final stage is used for general distribution work. In each of the stages of the multiplication work great care is required to be exercised in storing the seeds, in sowing, in roughing out mixture plants and in harvesting the crop. The multiplication rate depends upon the seed rate used and the yield obtained. For example in the case of wheat crop the multiplication rate is taken as. 10 i. e. the produce from one acre will suffice to sow 10 acres of land.

It is general experience that, with reference to the food crops the improved seeds technique has failed to show the inherent quality of seeds for improvement beyond a certain stage. This means that ordinarily improved seeds get mixed up with the common lot in the multiplication process and their good effect is not obtained on a general scale. As, many farmers are involved in the multiplication process the possible existence of mal-practices to obtain more profit cannot also be ruled out. This may also be the contributing factor in the deterioration of the improved seeds in the process of the multiplication work.

This is also the general experience in all countries using improved seeds that in poor soils improved seeds are not effective.

Whatever may be the reason it is the general experience of the field workers of the Agricultural Department that in food crops the improved seeds fail to give expected increased yield on a general scale.

It is suggested that in order to overcome the difficulties met with in the present process of the multiplication of improved seeds whole village may be selected for this purpose, so that the multiplication work can be better organised and better supervised. Seeds from this village may then be distributed to surrounding villages.

Whenever seeds of improved varieties imported from other countries or outside places are distributed they should be first tested for two or three years at various centres in the tract where these seeds are to be distributed. Recently rust resistance canfaad wheat seeds and improved cotton seeds of American Co. varieties were distributed in the Gujarat

areas without proper preliminary trials. These seeds were found unsuitable after growing them for a few seasons and this created lot of resentment among the farmers against the Agricultural Department.

(6) Manures and fertilizers :—Improved methods of the preparation of farm yard manure, composting, use of night soil etc. are on the propaganda list of the Agricultural department from the very beginning. If one were to visit any village one would find that progressive farmers are preparing best farm yard manure. No detail is left unattended in collecting, transporting and in depositing every days' collection in the manure pit. Most of the farmers in the same village, however, are careless in attending to details and as a result of this, the quality of manure etc. obtained by these farmers is poor. This is not the question of not being acquainted with the know how but of personal deficiency and/or want of resources.

In the same way the practice of composting and the use of night soil as a manure is not gaining ground thanks to certain religious beliefs. It may be pointed out here that it is the women folk in a village who attend to these operations. We have no means of propaganda for reaching the women folk of the countryside in order to educate them in better method of handling manure.

A shift in our propaganda and organisation methods is therefore, needed for dealing with these items of work. The use of fertilizers is becoming popular in the case of money crops. For their extensive use irrigation facilities, survey of soils and experiments with various crops under different soil and climatic environments are necessary and should be undertaken. Green Manuring :—This practice has not become popular because of various environmental and economic factors.

In the past simultaneous green manuring with the cotton crop was recommended but it had to be given up as it did not fit in with the general cultivation of the cotton crop. This practice was also recommended in the cultivation of the sugarcane crop in the Deccan canals area but could not hold the ground. Each agricultural tract has its own problems which require to be studied regionally.

(7) Among other items, introduction and the use of improved implements had in the past an important place on the propaganda list of the agricultural Department.

Ploughs of foreign make were introduced on a large scale in the Deccan areas. As the spare parts of these ploughs were not easily procurable, their introduction had to be given up. Their place was taken up by ploughs of local manufacture especially those manufactured by Kirloskar Brothers at Kirloskar wadi in the Satara District. Other improved implements in the market are Allen Gandhi hoes, a winnowing fan, a winnower etc, to name only a few. This line of work is weak and requires to be strengthened by special investigation work. A beginning has been made by creating a separate research section which needs to be strengthened. Other items have no definite place on the propaganda list of Agriculture department and require appropriate research work.

Extended Irrigation facilities:—Water is the most important single factor which controls the production in agriculture. In the First Five-Year Plan a place of pride was given to irrigation programme. There are complaints now that increased irrigation facilities are not fully utilized by the farmers. Farmers complain that, taxes which they have to pay for the use of water are exorbitant and not at all

economical. This is purely a socio-economic question. Technically in the irrigation programme no provision for the research work is made in this field.

No provision also exists for better land use programme. To get maximum advantage for the extended irrigation programme a research station should be started well ahead of the launching of the irrigation works so that when irrigation facilities become available the result of the research work to provide better means and materials is made available to the farmers, who should also be trained ahead to use water economically and usefully. A better land use programme should be worked out and made operative before irrigation is released for general use. It is the experience of the workers of the Agricultural Department that unplanned use of water creates more problems than those which it attempts to solve.

(9) Improved methods of farming, harvesting and processing:—Under these the important one is the propaganda and extension programme in the introduction of dry-farming methods.

It may be observed in any village in rural areas that about 25% of farmers are utilising better methods of farming and are realising double or treble the average per acre yield. In every village there is always a big majority of farmers who cultivate dwarf farms and have no means and materials in their hands for better use of seeds or to carry out farming operations in time to obtain better yields.

The extension work in this case to be successful must create co-operative organisations of farmers in each village.

(a) Control of pests and diseases :—The recommendations made by the Agricultural Department for the adoption of control measures are not taken advantage of due to lack of organisation among the farmers. Adoption of control measures by individual farmers is not effective in most of the cases and what is necessary is a group action.

(10) Cattle improvement :—This programme of Agricultural Department is very weak both in research and extension.

The weakest spot in the cattle improvement programme is the want of clear policy in this regard. Unless the public opinion is convassed and become vocal in this matter the present fluid policy of the Government will continue. In the interest of the development of the cattle wealth of the country a clear-cut policy of the government with action programme is an urgent necessity.

(12) Organisational :—Day in and day out our leaders emphasise that agriculture in the country can be developed only through co-operation.

It is, however, a sad fact that cooperation in farming has failed to achieve any tangible results. What are the reasons for it and what is the way out ? It is a complicated question and there are many aspects of it but we propose to deal here only with its technical aspect. A study of the working of the co-operative joint farming societies has revealed that, in their bye-laws there is no effective provision for technical advice, supervision and/or control.

Where such a society is started no care is taken to see whether it is a viable unit or not. At the time of the preparation of cropping scheme and for the supervision work there is no provision in it for associating an expert from the Agricultural Department. There is provision for financial audit but unfortunately there is no provision for effective technical control and speedy action in case the management of the society

suffers due to differences among members and as a result production of co-operative farm deteriorates.

It is suggested that starting of co-operative farming or co-operative joint farming should be the joint responsibility of both the Agricultural and Co-operative Departments. Like the financial control there should be provision for effective technical supervision and control.

Conclusions

(1) It will be seen from this brief survey that the present programme of agricultural propaganda and extension is weak in that it is not appropriately supported by the adequate research work.

The research work of the Agricultural Department is weak and not extensive. The research work should be organised tract-wise and on extensive scale and should be integrated with the extensive work.

To take maximum advantage of the resuts of the research work the farmers in each village should be organised. Farmers should be trained for co-operative work.

The starting and functioning of co-operative farming should be the joint responsibility of the Agricultural and the Co-operative Departments.

In the functioning of the co-operative farming societies there should be effective provision for the technical guidance, control, and speedy action in case of emergency.

Education of farmers in co-operative method at the various levels should form an important item of agricultural co-operation programme.

INDIAN AGRICULTURE—SUGGESTIONS FOR ITS IMPROVEMENT

By : **KR. NARAIN SINGH MATHUR**

INDIA is an agricultural country where agriculture is an industry of vast national importance and on it three out of every four of the population depend for their livelihood. Yet unfortunately unlike other agricultural countries where farmers are the richest people, the majority of our cultivators are ill-clad, ill-fed, and ill-brought up.

Is it not strange that those who follow the premier and the most profitable industry of the country are the poorest people when their fellow workers in other countries are rolling in wealth ?

What is their misery due to ?

How it can be remedied ? These are the puzzling questions for a student of rural economics in India.

One thing that both study and observation bring forcibly to the mind is the general poverty of the Indian agriculturist, - poverty in information as to how his condition could be improved and poverty in material resources to secure those things that would make his occupation progressive.

We know that poverty of a country can be minimised by enhancing its material assets and we also know that the material assets could be increased by the improvement of its premier industry which in our case is agriculture. A study of the present condition of Indian agriculture must lead one to endorse the opinion of Dr. Clouston—the then Agricultural Advisor to Government of India,

who said, "In India we have our depressed classes and we also have our depressed industries and unfortunately agriculture is one of them."

Judged by whatever standard, namely-

(1) The size and the constitution of the holdings.
(2) The implements used.
(3) The fertilisers employed.
(4) System of rotation of crops.
(5) The quality of the seed used.
(6) Irrigation facilities.
(7) Methods of cultivation.
(8) Marketing organisation.
(9) Animal husbandry.
(10) Subsidiary rural occupation etc., etc.,

our agriculture is in a hopelessly backward condition. It is not a case of a local disease requiring a bandage here or a liniment there but it is of a general breakdown of health requiring an all-round pick up.

As Mr. Keatings points out, " land in India often owes little to the human hand. It is unfenced, undrained, unembanked, unwatered, unmanured, carelessly ploughed and pure seed is rarely used." The results are obvious and require no mention. It is a common place remark that while by the force of circumstances agriculture has come to be the sole occupation of the people, it is the worst organised industry in India and has reached the stage at which in order to prosper it must progress. The population is increasing so fast and the demand for agricultural products is so great that it is imperative to make agriculture more efficient in order to improve the present standard of living. Agriculture can be made more efficient, that is to say cost of production can be reduced and margin of profit increased, by the application of science to its manifold problems. In the space at my disposal I will touch them very briefly and point out the remedies.

(1) At present the crops are grown not because they are the most profitable but because the cultivators are used to grow them from time immemorial. This causes a great deal of waste. When the communications were limited and the means of transport defective it was found necessary to grow not only food for home consumption but also crops relating to other necessities of life, but now the time is changed. Things can easily be had at the time of urgency not only from the remotest part of India but even from foreign countries. We should now grow better paying crops like sugarcane, tobacco, potato, fruits and vegetables according to the demand of the market and earn more profits.

The idea that the change of crops may not suit our soil and climate is unfounded. We have got instances where these crops are grown with marvellous success. All that is needed is to generalise the practice of growing paying crops in order to make the best use of land, labour and capital. So far a farmer lived directly on the products of his farm but now is the time to live on the profits of the farming.

(2) Again there is a great waste of female labour due to customs and prejudices. Men of all castes are engaged in farming but only "kachis" and "kurmies" are the best cultivators and can produce more on a given area than Brahmins, Thakurs and Mohammadens because their females work on their fields. This prejudice is not confined to females only but even males of certain castes do not work on their fields hence they are bad cultivators. It is too much to expect females to come out of purdah to work on their fields but certainly it is high time that males of high classes who take to cultivation as profession should not only work on their fields but should think it quite honourable to do so.

(3) One of the main causes of under production and rural impoverishment is our petty holdings. The evils of excessive sub-division and fragmentation are notorious such as tremendous waste of labour, energy and capital, the impossibility of making permanent improvements and difficulty of introducing improved implements, methods of cultivation and stimulus to litigation. Attempt should be made to make the holdings compact by mutual agreements among the cultivators and where necessary the help of legislation should be taken to eradicate the pest of fractionalisation.

(4) The permanent improvement of land demands our attention next. It can be done by fencing, levelling, making pucca water channels and embankments to prevent soil erosion.

Unlike the European countries our crops suffer for want of water hence conservation of the rain water to supplement the artificial sources of irrigation is one of the governing factors for a rich harvest. If the cultivators are made to understand that by making a Bund or an earthen ridge about 6 inches high along their fields before the rains set in they will not only be accumulating all the rain water but will be saving the fertility of the field which is always washed away by the flowing water. It is a common practice in Bundelkhand where many cultivators co-operate to enclose often an area of over a mile and consequently reap a very good wheat crop without irrigation. By adopting this practice the rain water is not only turned to profit instead of, as at present, eroding the country but will also raise the water level which will ultimately facilitate irrigation from wells.

Embankments can also be put across the "nalas" and the rain water thus accumulated can profitably be used for irrigation purposes.

(5) Everybody knows that an assured supply of water is an urgent need of a farmer. The food production of a country can be increased by the expansion of irrigation facilities. It will not only improve production but also increase area under cultivation.

Existing wells should also be better utilised. Many wells owing to shortage and dearness of labour and cattle for working the "Charas" are turned into famine-wells. All such wells should be cleaned and if the water supply is not sufficient boring should be done to increase their supply. As this is the development work and not a commercial speculation we should not mind sinking a little capital without an immediate return. The return will come later with increased prosperity and more certain harvests.

A better method of conveying water from the wells to the fields should be sought for to replace the expensive, clumsy and leaky earthen banks at present in use. To make the well water more profitable it is necessary to teach the cultivators to grow more valuable crops on the wells. It is a sheer waste of well water to grow cheap stuff like wheat and barley when better paying crops like cotton, sugarcane, fruits and vegetables can be grown. If it could be done full value of the well water will be realised and the number of wells will at once increase.

In order to be sure that the money to be spent in sinking a new well is a sound investment and the proposed well will turn up a profitable source of irrigation, it is absolutely necessary that a survey of water level of different places should be made which will give an idea about the expenditure and the probable supply of water from the well before the work is undertaken. The village tank should be repaired and extended

where possible. More canals should be constructed though they may not be directly remunerative. The tapping of underground water supply and power pump should be introduced on a larger scale.

Where irrigation facilities cannot be provided the introduction of dry-farming will improve the condition.

(6) It is an admitted fact that marvellous change is brought about within the last fifty years by the scientific researches in every art and profession and agriculture is not an exception to it. All the improvements in other things have been readily accepted and adopted but unfortunately the improvements in the premier industry of the country which have been demonstrated to be efficient and economical have not become popular hence the rural population has got the greatest share of poverty which brings disease, misery, sufferings and unhappiness to them. The ambition of every zamindar is to sow every acre in every season but he has neither the cattle to plough nor the manure to strengthen the soil nor the labour to weed it. We should make the cultivators understand that better farming is more profitable than large-scale farming. Small area properly ploughed, manured when required and sown with good seed is far better and more productive than scattering indifferent seed over a large area than can be properly managed.

The Vedas speak of plough driven by a team of eight bullocks, little did our ancestors dream of surface scratching ploughs that their descendents use today.

In Sanskrit Ratnagarbha and Vasudha are the names given to the earth meaning thereby that it carries priceless things in its womb. The deeper we dig the soil the greater we gain. Japan maintains a population of fifty-six millions on a cultivated area of seventeen millions or one -third of an acre per head as against India's five-sixth of an acre. The obvious explanation is that our average produce is rupees 50/- per acre against rupees 250/- in Japan where agriculture is carried on very intensively and thoroughly. The salvation of our farmers, therefore, lies in the adoption of the intensive methods of farming.

(7) The value of the pure improved seeds is great but unfortunatley it is not realised by the farmers of today. We have got improved seeds of almost all the important crops that are prepared by either selection or acclamatisation or hybridisation and they are giving in the cultivators fields an average increased produce of about three maunds per acre over the local varieties. The popularisation and distribution of such good pedigree seeds of high yielding qualities suited to the locality will improve the cultivation considerably and should therefore be introduced continuously and vigorously.

(8) Another necessity is to make the cultivators understand that growing of wheat and jowar is not necessarily the hallmark of good farmer. They must suit their farming to the market and not to go on blindly growing particular crops because their fore-fathers used to grow them when the labour was cheap and there were no roads or railways. An intelligent farmer can grow a very good crop of wheat in an unirrigated area by simply adopting the governing factors of dry farmings far cheaper than other cultivator who irrigates his wheat crop by well water and incurs heavy watering changes. Land rent of "Gohani" lands is always higher than those situated far from the towns and they cannot pay their way unless more paying crops are grown on them. Towns, big villages and railway stations have got great and expensive wants so the cultivators must grow

what sells best in them in order to make the best use of their land, labour and capital.

(9) With the industrial development labour has become very dear and the shortage is gradually increasing every year. The implements and the methods of farming which were profitable when a labourer could be engaged on annas eight a day cannot work efficiently when the wages have gone four times high. To meet the situation different types of labour saving implements have been invented for all the operations of farming. They do atleast four times the work and thus reduce cost of cultivation to the former level. The right and suitable collection of these improved implements is indispensable for a successful farmer of today.

Here it will not be out of place to add that in the majority of cases the criterion of success is wrongly considered to depend solely on the use of foreign implements. We should not jump to the conclusion that their introduction would lead to larger productivity but should take into account the types of implements suited to the different kinds of soils and the resources of an average cultivator to make use of them. What may have done great good in Europe or America and may hold out quite a hopeful prospect of doing good in India is not to be recommended as a useful thing unless its suitability in relation to our local conditions and resources have been gone into with care. An American plough, driven by steam, looked at independently, is certainly better than our Indian plough but when some of our friends recommend the replacement of our Indian plough by an American one they ignore that in America the area of an average holding is many times larger than what is met with in India and that the holdings in America are compact while in India the scattered fields is a general rule. Moreover its initial and recurring expenses and comparatively cheap labour and absence of the repairing facilities in the villages are prohibitive and therefore it is not profitable to replace the Indian plough by an American one. This is but an isolated instance to illustrate my point that in our anxiety to change and improve our agriculture we should move with care and caution and should make recommendations only after we have made sure that the thing or practice sought to be replaced is distinctly better suited to our soils and yet within the limited means of the cultivators.

As the purchase of improved implements involves expenditure it is the hardest lesson for our poor cultivators. The State should try the improved implements suited to our conditions and the soils and should demonstrate their efficiency to the cultivators who will gladly accept what will prove to be useful for their fields. The idea that Indian cultivator is ultra conservative, that he is disinclined to adopt better methods of farming and objects to every change in old manners, customs and practices does not seem to be true. Atleast my experience is just the reverse. All this is due to the fact that he is cautious, perhaps over cautious, which is justifiable in his case as being a man of poor resources he cannot afford to take risk and believes more in things done than mere words spoken or written. Whatever we can show him to be a useful and profitable thing within his means he will thankfully accept it.

(10) Insufficient manure is also partly responsible for the low out-turns of our fields. The proper application of manures and fertilizers will considerably increase the net yield of the soil. Experiments have conclusively proved that manure contributes about 50% of the

increased yield which with improved methods of cultivation can be often twice as much as the existing yield. There is a general complaint of the shortage of the manure but the best and the cheapest manure is foolishly burnt as dung cakes and the village sweepings are thrown in a heap to be blown away by the wind, washed away by the rain and desiccated by the sun and they poison the air and water and affect the health of the inhabitants. It should be preserved in pits which will not only double the quantity but will double the quality as well. Thus its manurial value will be increased and the sanitation of the village will improve enormously in addition. Cattle dung, poudrette and village sweepings are directly the life of plants and indirectly the life of planters. They should be taught that in the village this stuff is poison while in the fields it is gold. Attempts should be made and if possible legal restrictions should be put to stop this wasteful practice. In the interest of the public health, village sanitation and soil fertility it is absolutely necessary that the village sweepings are stored in the pits and the cattle dung is used for no other purpose whatever and all of it must be religiously reserved for manure and the land should be considered entitled to the whole of it without any exception whatsoever. One very good way would be to erect temporary bullock sheds in empty fields round about the village and keep the cattle in them so long the fields are fallow moving these sheds from field to field. Thus, the dung and urine will enrich the soil without any waste or labour expenses; or every family should dig a pit about six feet deep and instead of throwing these sweepings in heaps close to their dwellings they should put them into these pits which may also be used as village latrines some for men, some for women. A hedge round these pits for privacy and their old "Patas" put across them for convenience will make excellent sanitary latrines for them and all the rubbish added to it will not only keep their homes clean and family healthy but will give sufficient manure of vary good quality for their crops. They are not the pits of manure but are the cultivators treasuries and once they have seen the crops, the new manure produces, they will never allow rubbish to go anywhere else but into their pits.

Another very good way of utilising the night soil is to dig the trenches in the fallow fields and use them as latrines. The man who uses them as such should cover the excreta by the earth which is taken out in making the trenches and is left just close to them. If a field is once manured in this way it will yield a superfine crop of sugarcane and will need no manuring for another five years.

For the places where manure is not available or cannot be carted economically the practice of green manuring should be popularised. As soon as the rains set in Sanai seed is broadcasted in the field and after about 50 days when the crop is in flower it is ploughed in the soil. It will not only increase the fertility of the soil but will also improve its physical, chemical and biological properties.

The use of oil cakes as manure has not yet become very popular. The cakes are of two kinds. Edible and non-edible. Edible are given to the cattle as concentrated food while non-edible cakes like castor, mahua, neem and kusum cakes are very good nitrogenous fertilisers and a dose of 6 to 8 maunds per acre is sufficient to reap a full crop of wheat.

Chemical manures like Ammonium Sulphate, Bone, Superphosphates and Sodium Nitrate are also very effective and their use should be popularised.

(11) The great importance of a healthy and adequate livestock to an agricultural and vegetarian country like India cannot be over estimated and yet in these respects Indian conditions leave much to be desired. India is handicapped today by a very insufficient and inefficient livestock.

There is too great a pressure on our plough cattle and consequently the fields are not well ploughed up resulting in poor out-turns. Therefore, the improvement of cattle is one of the best ways to effect general improvement in agriculture. To improve them both as regards quality and quantity we must undertake the provision of pedigree bulls, elimination of bad bulls, better veterinary facilities, plentiful supply of good fodder, steady grading up of cows and development of dual purpose breed that may supply cows of the best milking capacity and bullocks best suited for ploughs. It is obvious that if we keep first class cattle we shall get far more milk and ghee, and far better bullocks to plough with or sell than by the present bad cattle so that we shall not require so many animals as we have to keep now and this will mean more grass and fodder for the good cattle that we will keep. Since the maintenance charges of a good or a poor cattle are the same it is a false economy to keep a swarm of useless cattle when a few good ones give the same out-turn at less maintenance charges. They cost us as much to breed and to feed as good ones and do only quarter of the work. We cannot do away with all the existing cows and bulls of the inferior breed at once but to start with the bad bulls can be castrated and used as bullocks and replaced by pedigree bulls. Cows crossed by these pedigree bulls will give better progeny which will be completely improved in the fifth generation. Bad cattle means bad farming hence the first necessity for the improvement of farming is the introduction of good breeds of cattle.

(12) Proper rotation of crops will increase the produce and will at the same time maintain the fertility of the soil. Most of the cultivators of today are ignorant of the fact that if the crops exhaust the soil of its fertility there are some crops which are restorative, and instead of impoverishing the soil they make it rich in the most important plant food i. e. nitrates. These crops are of the Leguminous order. Their roots have got nodules containing the nitrogen fixing bacterias which absorb the nitrogen from the atmosphere and leave it in the soil in the form of plant food for the following crop. If the cropping scheme of every cultivator is so arranged that an exhaustive crop is followed by a crop of Leguminous order which is restorative, the fertility of the soil will be maintained to a certain extent. All that is needed is to let the cultivators know the names of the restorative crops and to make them understand how these crops enrich the soil and they will adjust their cropping schemes according to their needs.

(13) They should also be made to understand that the burning sun of May and June not only changes the dormant plant food into available forms but also kills the roots of weeds and insects and pests and thus the hot weather cultivation is equavalent to manuring. The fields ploughed with soil-turning iron plough which leaves no unploughed ridge and no roots and woods will keep the moisture far longer than the land scratched with country plough and left full of woods and roots of last crop to suck up the little moisture left in the soil.

(14) At present almost every cultivator is dependent upon the money-lender and a long chain of middlemen

between himself and the consumers and has thus to submit to unduly low prices for his products. Co-operative Society seems to offer the best chance to the agriculturist for realising the full market price for his produce. The Society will purchase all the produce of the members and will arrage for its sale directly with the big grain dealers and thereby make the additional profits for the members which would otherwise go to the middlemen. The Society will also stock improved seeds, implements and manures to supply to the members.

(15) The introduction of the suitable cottage industries will also help the cultivators out of their pecuniary difficulties. Except in the tracts where irrigation is plentiful and thus two to three crops can be taken in a year the average farmer does not get employment on his farm all the year round. On account of the seasonal nature of the agricultural operations idleness is forced upon him for about 150 to 200 days in a year. This slack period can profitably be utilised in cottage industries. Mr. Darling points out that the only way in which a small farmer can keep himself out of debt is by being frugal and industrious and by having second string to his bow. Sericulture is an important rural industry in China and Japan. In the European countries agriculture is of a mixed and varied character and gives employment to the cultivators without interruption still all of them have got their rural industries like dairying, pig keeping, poultry etc.

Attention should therefore be paid to ascertain which of the following subsidiary industries can conveniently and profitably be taken up by our rural population.

Hand spinning and weaving, dairy farming, poultry, fruit growing, market gardening, leather work, sericulture, lac-culture, tanning, mat-making, bamboos work, pottery, toy making, wood work etc., and the cultivators should be induced to take up any one of them.

(16) We have been told that the rural uplift will come with the spread of education among the masses, but illiteracy is less now in our villagest han fifty years ago yet rural affairs were better looked after on the whole in centuries prior to our own. The present system of education has not become an uplifting force rather its effect is contrary to expectations. It generally unfits the son of a cultivator for his hereditary calling because it is too literary and devoid of the subjects with which he has to do in his life, and since he remains out of touch from his hereditary professions during his school life of six or seven years he looses his interests in it. Another reason why the sons of the cultivators do not take to their fathers' profession after their return from schools is the prejudice that any kind of manual labour is below the dignity of a person who has received some education however elementary it may be. This demon of prejudice has to be fought against and conquered if education in rural schools has to do us any real good. If education in our primary schools is made more practical and less literary it will go a long way to diminish if not altogether kill this prejudice. Basic education on wardha pattern is the remedy.

I would like to suggest that the demonstration farm should be attached to as many of our rural schools as our financial conditions permit and the attendance in the agricultural classes should be made compulsory for all the students who would do actual work on the farm in ploughing, weeding, reaping, manuring and the like. It will keep the sons of the cultivators, which form the majority in the classes of the rural schools, in actual

touch with their hereditary profession and will teach the efficiency of better seeds, implements and improved methods of cultivation and will make them realise that labour in the fields is atleast as honourable as work in the office or class room.

Bad crops, low harvest and hence poverty in the rural areas is mainly due to one or some or all of the above noted defects but Providence is always blamed for what is really due to the stupidity of the cultivators. Whatever happens whether the cattle are weak, seed is bad, soil is poor, method is defective, insects damage the crops but always God is blamed and not the ignorance, idleness and folly of the cultivators. If he is made to understand that his yield is not good because of his old methods of farming, his being victim to diseases owing to insanitary and filthy dwellings, his illiteracy and want of knowledge of the improvements in the art of cultivation and that he is not happy because his children are unhealthy and he wastes much of his money in litigation and bad social rituals his condition can be improved.

Difficulties are neither few not light. To persuade a cultivator to agree to part with his old customs and practices is to revolutionise the man bent double with the weight of his prejudice and age-long conceptions. His ignorance, illiteracy and conservative nature fill him with all sorts of apprehensions and yet the scheme must be launched and worked with strenuous earnestness.

The department of agriculture has conculsively proved beyond any doubt that every acre of land can with improved methods of cultivation be made to yield 30% to 70% more of every kind of crop than it at present produces.

The problem requires proper handling by experienced technical yet energetic workers and on its solution depends the happiness and prosperity of the vast rural masses and increased revenue of the State.

NEED FOR RE-ORIENTATION OF OUR TEXTILE POLICY

By: **Prof. C. L. KHANNA**

NEXT to food, clothing constitutes an important element of our civilized existence. That is one of the reasons why the major emphasis in the industrial development in India during the inter-War years has been on cloth and other consumer goods industries, while the development of basic industries lagged behind. Between 1922, when the policy of discriminating protection was adopted, and 1939, when the Second World War broke out, the production of cotton piece goods in the country increased 2½ times. During the Second World War the net production increased from 3790 million yards in 1939-40 to 4712 million yards in 1945 and in the post-war years the total production registered a further rise from 4025 million yards (in 1946 to 4188 million yards in 1951 and 5280 million yards during 1956. Despite this rise in output over the last 34 years, the *per capita* consumption of cloth has, indeed, been very low. With the rise in the national dividend to the tune of 25 percent during the Second Five-Year Plan, it is anticipated that the *per capita* consumption

of cloth will increase. Assuming that cloth consumption will be 18.5 yards per head, the total requirement of cloth for internal consumption would work out to 7400 million yards for 400 million souls in our country. Adding 1000 million yards for export purposes, the cloth demand would aggregate to 8400 million yards as against the 1955 output of 6847 million yards (5094 million yards from the mill sector, 273 million yards from the power-loom and 1480 million yards from the hand-loom sector). This means that a big leeway of 1553 million yards has yet to be made up.

The New Policy

In order to give a fillip to the handloom production (which was recognised by the Gandhiites as the panacea for the solution of the unemployment problem in the country), the Karve Committee recommended that the "production by mills and powerlooms should be limited to the level already reached, that is, to 5000 and 200 million yards respectively and that all the increased demand during the Plan period should be met by the expansion of handloom production. The Union Government accordingly made a policy announcement in June 1956 allocating the production to each sector as follows :

(Fig. in Million yards)

SOURCE	Present output	Additional quota	Total.
1. Mill sector	5094	350	5444
2. **Handloom.**			
(a) using mill yarn	1480	700	2180
(b) using Ambar yarn	..	300	300
3. Power-loom	273	200	473
Total...	6847	1550	8397

The allocation of the additional cloth quota of 350 million yards during the Plan period is but an eye-wash. The dice is heavily loaded in favour of the handloom sector. In this connection it will not be inapt to recall the observation made by Mr. T. T. Krishnamachari, the then Union Minister for Industries and Commerce :

"I am against limitation of production of the mill sector but unfortunately, other people in the Government differ from me. I feel that the best method of helping the handloom industry will be to have mill industry heavily loaded, thereby giving a price advantage to the handloom industry".

The question that claims our consideration is whether the new policy of freezing the mill-made cloth production is justified by the growing and dynamic economy of India.

Repercussions of the Policy

Low Production :—From the figures of the textile production it appears that there has been a downward trend in the mill-made cloth production. The production which touched the mark of 467 million yards in July 1956 slumped down to 432 million yards in December 1956. While in the first half of that year the total output stood at 2583 million yards as against 2491 million yards in the corresponding period of the previous year, the second half witnessed practically no increase (the production being 2655 million yards during July-December, 1956 as against 2603 million yards in the same period of 1955). This static condition in the post-policy period is obviously attributable to the ante-diluvian thinking on the part of our Government.

Fall in exports :—The export of cloth has suffered a decline during the last year as compared with earlier years as revealed by the following data :

Year.	Export in million yards
1950	1133
1951	780
1952	586
1953-54	740
1954-55	761
1955-56	680

The target for exports in the Second Five-Year Plan period has been fixed at 1000 million yards as already stated. During the year 1956-57 it was estimated that the export was only about 127 out of every 1000 yards of mill-cloth produced, as compared with 151 yards in 1954-55. The reasons for the decline in exports are, firstly, the increase in the home demand; secondly, the Government policy of discouraging the expansion of the mill industry and the consequent short-fall in the supply of mill-made cloth and, thirdly, a rise in the price of cloth. It is apprehended that with the depletion of stocks and the pressure of rising demand against the limited stocks there is likely to be cloth famine, besides the loss of foreign markets, and the much-needed foreign exchange. For example, during the recent past the Indian piece-goods have suffered a heavy setback in West Asian countries. An idea of the trends of cloth exports to the following six West Asian countries can be had from the figures cited below :

Table showing cloth exports to West Asian countries.

Countries.		Exports in million yards 1953-54	1954-55	1955-56.
1. Aden	..	80.10	51.16	38.07
2. Saudi Arabia		18.69	11.71	17.91
3. Bahrein Islands	..	3.06	2.44	3.18
4. Iraq	..	10.68	11.42	8.32
5. Iran	..	3.15	12.29	2.97
6. Kuwait	..	18.04	5.73	4.40
Total	..	133.72	94.75	74.85

The main causes for these reverses in exports are :—

(a) The change in the taste of the consumers during the last five years from coarse and medium varieties to fine and superfine cloth. Evidently, when the emphasis in our textile policy is on the production of handloom cloth, India cannot oust other countries., e.g., Japan in the supply of such varieties of cloth as can find a market in the West Asian countries unless, of course, we are able to produce them through revolutionary changes in the technique of production of handloom cloth.

(b) The Indian textiles do not supply quality cloth of the required specifications.

It is, thus, clear, that under the new textile policy the prospects of boosting up cloth exports from India to foreign countries are very bleak.

It is very distressing that while countries in the West and Near East are taking long strides in achieving self-sufficiency in cloth production, India will, for some time to come at least, remain dominated by the "Charkha Economics". Dr. P. S. Lokanathan, Director-General National Council of Applied Economic Research, observed that "Indian cotton textile industry would lose heavily in the international market, if it were to rely exclusively and increasingly upon the domestic market." So that India is at present confronted with the two-fold problem of finding adequate cloth supply for external markets and to meet the home demand rising with the tempo of our economy. That is why the World Bank Mission sounded a warning in an informal memorandum on "Indian Economic Problems and Policies" which was submitted to the Government of India. They said :—

"We believe that this compromise will prove largely unworkable. In our frank judgement, it greatly under-estimates the practical difficulties of installing and getting into operation the requisite number of Ambar Charkhas and power-looms on a decentralised basis. The programme chalked out by the Government for meeting the increased demand for cloth will either jeopardize the supply of an essential consumer item at

reasonable prices on the domestic market or bring about a serious curtailment of exports at a time when prospective export earnings appear already far short of what is required".

This unambiguous and emphatic disapproval of the compromise textile policy of our National Government seems to have gone unheeded. Mr. Morarji Desai, Minister of Commerce and Industry, while inaugurating a conference of textile industry and trade organised by the Federation of Indian Chambers of Commerce and Industry, said :—

"The handloom industry which is the biggest employer today, has got to be protected and developed to the maximum possible extent. The Ambar Charkha and the hand-spinning wheel have great potentialities in the existing social structure of our country. It must be given not only the blessing of all of us in the country but also positive promotional assistance so as to give this decentralised sector an unfettered scope for development."

It appears that the whole issue is not examined in an objective manner. If that were done, it can at once be realized that it is to subserve the various ends—employment, price and export. While the textile industry in Japan had a preponderating percentage of automatic looms, that is, 67 per cent, India had only 7 percent. Similarly the enhancement in the excise duty on cloth by more than two and a half times during the last two years, has adversely affected the consumer. By following this policy we shall lose the good of both the worlds: we shall neither have self-sufficiency internally nor shall we be able to stand the competition of other countries. It is only by the adoption of a well-balanced textile policy in the true perspective that this century-old industry will flourish to the benefit of the over-all economy of the country. There is thus a strong case for the re-orientation of the cloth textile policy. It must not be governed by any dogmas but by the perspective considerations.

GET HIGHER YIELDS IN WHEAT

By: **K. K. MANDLOI**

WHEAT is the second major food crop of our country. Its cultivation is very ancient, so much so that Narmada Valley is considered to be one of the oldest wheat growing tracts in the world. It is shocking, therefore, to note that in the comity of nations India stands at the bottom with respect to average yield of wheat. According to F. A. O. Report of 1952, it is barely 589 pounds while that in France, which is at the top, it is 1490 pounds.

Due to recurrence of rust and drought wheat cultivation had become a gamble and there was progressive diminution in the area under wheat. Unfortunately, due to complete absence of irrigation facilities in most of the parts and to the exhaustion of the soil on account of growing wheat for generations without manuring or proper rotation, the outturns have stabilised at the lowest level.

It is common knowledge that greatest emphasis is laid in the second five-year plan on increased production and it is therefore, all the more essential for us to find out ways and means which would help us in achieving our objective. Let us therefore, consider the factors which are responsible for higher yields. They are :—

1. Manuring—(a) **Organic manures** as Compost, Green manuring etc.
   (b) **Fertilizers.**
2. Rotation.
3. Irrigation and
4. Use of improved seeds.

Organic Manures—It is accepted on all hands that soil fertility has declined to the lowest level. We have been growing wheat after wheat for years and have thus deprived the soil of its organic matter. It is, therefore, an absolute necessity to replenish it. Organic manures build up soil fertility. In addition to maintaining the soil in good physical condition, organic manures help to supply large quantities of plant nutrients to the soil. Thus, an application of 100 maunds (about 10 cart loads) of cattle-shed manure or farm compost supplies about 40 to 50 pounds of nitrogen, 20 to 25 pounds of phosphoric acid and 50 to 60 pounds of potash to the soil. The one element that is likely to be deficient in cattle-shed manure is phosphoric acid and it is a good practice to make up this deficiency by adding to the soil along with the manure, a supplement of phosphate in the form of bonemeal or super phosphate or finely powdered rock phosphate at the rate of say, one maund of the phosphate for every 100 maunds of cattle-shed manure added to the soil. Town compost, however, is richer in phosphoric acid and it is unnecessary to add a phosphatic supplement along with it.

Besides the direct supply of plant nutrients to the soil, organic manures help indirectly to increase the availability of the nutrients already present in the soil. The soil usually contains large quantities of phosphoric acid and potash locked up in unavailable combinations. The addition of organic matter liberates large quantities of carbonic acid due to microbial decomposition, as well as substantial amounts of nitric and sulphuric acids and these react with the soil minerals and liberate the phosphate and potash contained in them in forms which could easily be absorbed by the plant.

Addition of these manures may not give increased output in the year of application but we do get their residual effect in the following years. These manures have been found to be effective for a period of three years. It should, therefore, be convenient and practicable to use these manures in the entire holding by forming suitable blocks. About 10 to 15 cartloads of organic manure per acre would be quite sufficient.

Green Manuring—Wherever irrigation facilities are available green manuring should be adopted. Green manuring is done to add a great bulk of organic matter in the soil and thus enrich it with nitrogen, a major plant food which is chiefly deficient in our soils. More than 90 percent of the nitrogen in the soil is usually present as a constituent of organic matter which becomes gradually available to the plants as decomposition proceeds. So long as nitrogen exists as a part of the organic matter, it is neither subject to leaching nor available to plants. Soon after the organic matter decomposes, nitrogen is gradually released first as ammonia which may be directly absorbed by plants or oxidised to nitrates, which may be rapidly leached if not used. Organic matter is not only a principal source of nitrogen, but also of phosphorus, calcium, sulphur and other mineral constituents of plants, including the minor elements, which are minor only in quantity but not in function.

A green crop may be turned under at a stage when it is just about to flower. This may roughly coincide with a period of eight weeks from sowing in the case of most of the crops. From among the

legumes, the common green manure crops are Sannhemp (*Crotalaria juncea*), Dhaincha (*Sesbania spp.*) and Tarota (*Cassia tora*).

Experimental results have shown that the green sannhemp crop when ploughed down gave an increase of 13 percent over 'no manure' treatment and the same in combination with super-phosphate at the rate of 164 pounds per acre gave 20 percent increase over 'no manure'. It is therefore, desirable to give super phosphate to the green manure crop with the seed at the rate of 1½ maunds per acre. Experimental results have also shown that green manure has a marked effect on the yields of all subsequent crops due to residual carry over.

Fertilizers—They are more concentrated than organic manures and are in a soluble condition and hence their effect is immediate and marked in improving plant growth. Being smaller in bulk, chemical fertilizers could easily be transported from place to place even over long distances and could be spread over the land at less cost. Since the food requirements of different crops in respect of nitrogen, phosphoric acid and potash vary from one crop to another and from one soil to another, it is possible to prepare suitable mixtures of these fertilizers to suit each locality and each crop. The composition of organic manures is more or less fixed and is generally poor in phosphoric acid and as such is not suited to give maximum production on all types of soils.

What is important about fertilizers is, that they give higher yields only in the year of application. They should be drilled along with the seed. Experiments have conclusively proved that a combination of both nitrogen and phosphate are more beneficial to the crop. Even under dry conditions, the effect of fertilizers is very spectacular. Here a note of warning must be struck. It is important to bear in mind that for the use of fertilizers, soil moisture is the limiting factor. For a dry crop of wheat 15 to 20 pounds of nitrogen and an equal quantity of phosphate are recommended and for an irrigated crop double this dose is necessary.

Cultivators are, rather reluctant to use fertilizers for a dry wheat crop because they think that by using them the crop is burnt. It is not so. Fertilizers have no adverse effect on the crop provided proper moisture is present in the soil. Efforts should, therefore, be made to conserve soil moisture. Under such conditions the fertilizers are bound to give higher yields.

Rotation—It is not desirable to take the same crop from a field year after year as this only relieves the soil of its nitrogen content and other organic matters which are not readily returned. Crop rotation has, therefore, to play a very vital role in our wheat cultivation. For rotation any legume can be grown. Gram is the most common rabi crop grown for rotation. The question may be, why only legumes? It is for the simple reason that leguminous plants carry nodules on their roots and these nodules are the seat of nitrogen fixation process. The main difference between legumes and non-legumes is that the former add both nitrogen and organic matter to the soil, whereas the latter supply only the organic matter and hence for green manuring also the legumes are preferred.

For rotation the sequence to be followed is WHEAT-WHEAT-LEGUME. It has been found that wheat-tur rotation fetches the highest profit. The next best recommendation is wheat-gram rotation. A set of experiments conducted at Powarkheda Farm (M. P.) between the period 1941-42 to 1948-50, gave the following results :—

Crop rotation	Income in rupees
Wheat after wheat	72
Wheat ,, tur	126
Wheat ,, gram	99
Wheat ,, birra	80

(Birra = wheat-gram)

Looking to the utility of rotation, it would be desirable to divide the holding into suitable blocks and then follow the above mentioned sequence i.e., wheat-wheat-legume. For the leguminous crop phosphatic fertilizers should be used. Phosphorus is one of the major elements which is needed in adequate quantity in available form for the growth and reproduction of plants. It encourages root development.

Irrigation—Agriculture in our country is entirely at the mercy of "Rain God". If we get good rains during monsoon, the crops are good and conversely, dry years mean a famine. Our lot can considerably be improved by resorting to irrigation. Before the initiation of our development plans, it was beyond the reach of an average cultivator to irrigate his crop. They also thought, of course, very wrongly, that by irrigation their crop would be damaged by rust. It used to be so because the varieties grown were highly susceptible to rust. Availability of improved seeds has now changed their view and they are willingly resorting to irrigation. The five-year plans have been a boon in this respect. At present so many projects, small and large, are at our disposal and a few more would be added by the end of the second five-year plan. It is now up to us to make the best use of water thus made available. Of late, growers have been sinking wells and installing pumping sets to irrigate their crop. As a result of irrigation there is profuse growth of the roots, especially secondary ones which in turn provide a better anchorage to the plants. Deficiency of soil moisture is made good and finally the fertilizers given are made readily available to the plants. This results in good growth and a bumper crop.

Water should be added judiciously. Experiments have shown that only three irrigations of three inches each, are optimum for wheat crop. It is no use flooding the crop in which case large quantities of water is wasted. As regards the time of irrigation, first irrigation should be given about a month after sowing. The second one four or five weeks after the first and the final irrigation should be given at the time of flowering. Irrigation along with application of fertilizers is indispensable for obtaining higher yields.

Improved seeds :—All the factors mentioned earlier would be of no help unless improved seeds are used. Every one is aware that the wheat crop is most susceptible to large scale destruction by rust. There is hardly any other plant disease which is so destructive. The most unfortunate feature about rust is that in years when winter rains are favourable promoting bumper crop growth, chances are three in four, of the outbreak of stem rust in epidemic form. Such a season instead of witnessing a boon turns out tragic on account of untold devastation of the crop by rust disease. To avoid such large scale losses due to rust, it is of prime importance that only improved seeds should be used. Essentially, therefore, the first step to rehabilitate the dwindling wheat cultivation is to use rust-resistant wheat seed evolved at different research centres.

There are three kinds of rusts of wheat, viz.,

1. Black–caused by *Puccinia graminis*
2. Brown– ,, ,, *Puccinia rubigovera* (triticina)

and 3. Yellow– ,, ,, *Puccinia glumarum.*

Black rust attacks the stem most severely and is therefore, called the stem rust. As a rule it is the last to appear.

Brown rust attacks the leaves almost exclusively. Infection is generally found on the upper leaf surface only. Brown rust generally makes its appearance first, often before the flowering period.

Yellow rust attacks the leaves most seriously. The infection occurs on both surfaces of the leaf. More than one form may occur on the same plant at the same time.

In Madhya Pradesh, it is the black rust which is of frequent occurrence and responsible for large scale damages to the wheat crop. An estimate of the damage to the crop was made in the years 1943–44 when only a few districts were affected and again in 1946–47 when the entire province (old M. P.) was in the grip of the disease. The crop cutting experiments revealed that the loss amounted to four and sixteen crores of rupees respectively in these years. From these figures it would be clear how colossal are the losses due to rust.

There are no prophylactic methods for the control of rust. If the varieties affected are susceptible and should infection be followed by rain and due, it is almost impossible to save the crop. Sulphur dusting is not recommended as several dustings are necessary and the cost is prohibitive. The only feasible method is to develop and cultivate rust-resistant varieties through hybridisation. A good deal of work has been done at the Indian Institute of Agricultural Research, New Delhi.

In Madhya Pradesh, similar work was undertaken in June 1941 at Powarkheda in the Hoshangabad district under the able guidance of Shri R. B. Ekbote, Wheat Specialist. Over ten years, hard work at this station on evolving a wheat variety that would not only yield better but also offer resistance to rust disease, has met with success. One of the varieties evolved here is Strain 65. This is a cosmopolitan variety suitable for diverse soil and climatic conditions. It is eminently suited for heavy manuring and irrigation. Being mid-early in maturity, it is also suitable for double cropping. Growers are most impressed by its thick, dense ears and bold, lustrous grain. On account of its good grain quality this variety fetches a premium of two to three rupees per maund over other wheats in the market. It possesses thick straw which lends it a very good stand. Even when given 60 pounds of nitrogen and 60 pounds of phosphate with four irrigations of four inches each, it shows no lodging. It won the first prize in All India Crop Competition by giving an yield of 72 maunds per acre in 1953–54.

Other important varieties are hybrids 11, 38, 25 and 277. Hybrids 11 and 38 are most suited for dry cultivation. Hy. 11 is another cosmopolitan variety which fairs well both under dry and irrigated conditions. Hy. 38 is drought resistant and gives highest yields under dry conditions. It is a soft, white grained *pissi* variety. Hy. 25 is suited for lighter soils and does well under irrigation. Hy. 277 is somewhat late in maturity and is recommended for irrigated areas. These different varieties are recommended for different tracts on the basis of yield trials conducted for a number of years to find out their suitability to varying soil and climatic conditions.

Earlier, cultivators were afraid to irrigate their crop because they thought that by irrigation their crop would be damaged by rust. But with the evolution of rust-resistant wheat varieties, all such false fears have been set at rest and they are now taking to irrigation in increasing numbers.

The day is not far away when the lot of an average cultivator would have been much improved because they have begun

to realise the importance of science and the usefulness of various recommendations made from time to time. They are also being helped by State Governments by way of granting generously taccavi loans for different agricultural purposes. In order therefore, that we stand by our pledge to increase the output of food grains and make our country self-sufficient, it is very necessary that we endear the various recommendations put forth. It is a sad fact however, that such recommendations are viewed with certain amount of suspicion and uncertainty and are not readily accepted. On this account it is suggested that whosoever wishes to reap a bumper crop, should adopt these methods on a small scale to start with. There is no doubt that the results achieved would be self convincing as all these recommendations are based on experimental results.

RECOMMENDATIONS FOR THE CULTIVATION OF SUGARCANE IN UTTER PRADESH

By : **S. K. CHOPRA**

Introduction

OUT of an area of 1,45,00,000 acres under Cane cultivation in the Sugar world, approximately 40,00,000 acres, constituting about 28% of the total area, are in India, and out of that, about 50% is in Uttar Pradesh. The yield of cane per acre is low in India i.e., 14.70 tons, as against 62.05 tons in Hawaii, 56.20 tons in Jawa and 41.14 tons in Peru etc.

This crop plays a very important part in the Agricultural economy of the country. Low acre yields of cane is the chief handicap in India. "The future of the Sugar Industry depends mainly on the cost of producing the primary material, viz., Cane, and the problem is therefore, one of protecting a particular branch of agriculture until such time as improvements in methods of cultivation and development in research enable the agriculturist to increase his yields per acre, and thereby effect a substantial decrease in the cost of cane, while maintaining or increasing his own profits." Tariff Board Report, 1931.

Average yield of cane target for 1960-61 during the Second Plan has been fixed as 22.0 tons per acre for Uttar Pradesh. For obtaining higher yields of cane economically, some recommendations are given, which, it is believed, will go a long way in stepping up the cane yields.

1. **Knowledge of Soil Types :**—Sugarcane flourishes under a great variety of soils and climatic conditions. The soil types also show a wide variation from locality to locality and include light, medium, and heavy soils. Each type requires its own particular form of treatment to enable it to produce profitably under the varying conditions of climate and rainfall, as well as special attention in respect of manurial additions and soil improvers. So certain types of cultivation have become associated with particular soil-climatic conditions, and as far as can be judged from cane yields seem to be well adopted to the several localities.

The knowledge of soil types is considered essential to be able to recommend varieties and manures suitable for different tracts. A brief account of classification of soils in Gorakhpur and Deoria districts of Eastern Uttar Pradesh is given below. Similar informations can be had from the Zonal Sugarcane Research Stations for other areas also.

Type 1. :—These soils have been named Calcium Soils with a large reserve of lime, locally known as Bhat soils. The texture of these soils is silty or sandy loam.

Type 2 :—These soils have been named partially leached Calcium soils underlaid with a bed of Calcium carbonate accumulation. The texture of these soils is loamy but at places it tends to be definitely clay.

Type 3 :—These soils have been described as leached Calcium soils, since they show considerable leaching. The texture of these soils is mostly sandy loam with enough quantity of coarse sand except in comparatively low lying areas where it tends to somewhat clayey.

The soil suitable for sugarcane cultivation should be of 3′ at least in depth. Soil rich in Nitrogen brings good yield. Deep alluvial soils which should be clayey loams rather than sandy are more suitable for sugarcane cultivation.

2. Selection of field :—The land should command sufficient irrigation with good sub-soil drainage. If soil lacks drainage, open out drains 50–60 ft. apart. Put in as much acreage under cane as can be conveniently and efficiently controlled, larger areas than these are economic waste.

3. Preparatory Cultivation :—Green manure is a good source of organic matter. Prepare the field lightly and broadcast green manure seed (San–hemp) at the rate of 1 maund per acre at the break of mansoons and cover the seed properly. After 60 days when the crop begins to flower, plough in the crop and pass a log of wood over the ploughed land. Moong is also recommended for green manuring. It does well even on unmanured land and prefers non–water logged areas. It has proved both cheaper and convenient than san-hemp for the purpose. One month after the green manure crop has been incorporated into the soil, plough the field with mould-board plough as deep as 9″–12″, if soils allow. Generally 8–10 ploughings are to be given during the preparation period in different directions till the field has obtained a good form and fine tilth. Passing over a log of wood over the field is very essential after each ploughing. Open out furrows with the Ridger two months before planting time, dress them up and stir the furrow surface with a Ridge hoe as deep as 3″.

It is generally stated that the spacing between furrows should vary with the type of soils and the standard of cultivation. Higher fertility of field needs wider spacing and the lower fertility closer spacing. The following table will give an idea of the spacing to be adopted for any level of fertility :

Level of fertility	Expected yield per acre.	Spacing to be given.
High (100–200 lbs. N. and 8-12 irrigations).	900 to 1000 mds.	3½ feet.
Medium (about 100 lbs. N. and 6-8 irrigations).	500 to 900 mds.	3 feet.
Low (about 60 lbs. N. and 4-6 irrigations.)	400 to 500 mds.	2½ feet.

Type 1 soils require almost no irrigation but for higher yields of 900 to 1000 maunds per acre, 2–3 irrigations will be sufficient. Thick varieties require wider spacing whereas thin varieties narrower spacing.

4. Selection of Varieties : Only those varieties should be grown which are immune and resistant to diseases and pests and approved by the Cane Department. The varieties recommended for different types of soils in Gorakhpur and Deoria districts are given below:—

Type 1 :–Co. 356, Co. 453, CoS. 443, CoS. 416, Co. 513, Co. 617

Type 2 :–Co. 513, Co. 453, CoS, 443, Co. 356, CoS. 416,.

Type 3 :-CoS. 443, Co. 453, CoS. 109, Co. 617, Co. 395, CoS. 416 (where irrigation facilities exist.)

Similar recommendations are available from the Zonal Sugarcane Research Stations for other tracts also. It is an established fact that thick varieties give better yields than thin varieties when grown under similar conditions : but the growers are advised in their interest to grow a combination of early ripening and late maturing varieties. This will enable them to supply cane to the factory maturity-wise conveniently. A table showing early, medium and late varieties which are recommended by the Cane Department, is given below :-

Range	Early varieties.	Medium varieties.	Late varieties.
Eastern :	Co.395, Co.513, CoS.416.	CoS.109, CoS.443 CoS.510, Co.617.	Co.453.
Central :	Co.313, Co.395, CoS.416.	CoS.443, Co.617.	Co.453.
Western :	CoS.321.	CoS.245, Co.421,	Co.453.
Fyzabad :	Co.313, Co.393, CoS.416, Co.527.	CoS.109, CoS.443.	Co.453.
Rohilkhand :	CoS.321, Co.527.	CoS.510, CoS.514, CoS.245.	Co.453.

Co.356, a midlate variety, thrives well on Bhat soils of eastern range and is approved accordingly. B.O.3 and B.O. 10 are also approved for water logged and Bhat areas of Eastern and Mid-eastern Ranges.

5. Planning of sugarcane—Timely planting of sugarcane has given good results everywhere. Late planting gives definitely low yield of cane. The following period of sowing has been recommended :

Eastern Range - 15th January to 15th February.

Central Range - February

Western Range - 15th February to 15th March

October sowing has been considered to give high yields and better juice quality and wherever possible autumn sowing of mid-ripening varieties should be encouraged.

Seed rate will be higher in case of thick varieties and also poor germinating varieties. Generally 12000 to 16000 sets are required to plant one acre. The Selection of planting material is of high importance, and well repays the most careful attention. The cane used for planting should preferably be grown plants about ten to twelve months old. The top portions of cane have given better germination. Strict selection of cane sets is very essential. Only disease-free and healthy planting material should be used. Trench method of planting is recommended. However, planting on flat and earthing up during the monsoons has also given good results. The moisture in the soil sould be adequate for the germination of cane sets. Use 3 budded sets and place them "end to end" and 2 sets at the edges of the furrow, then cover the sets with a thin layer of about 3" soil. Germination will be seen in about twenty days.

Pre-treatment of sets with aretan and agallol has given good germination particularly when sowing has become late andthe variety is shy germinator.

A bullock drawn sugarcane planter is also available in the market and with this implement the cost of planting works out to Rs. 4/12/- per acre, as against Rs. 18/6/5 per acre with the usual bullock

drawn ridge plough. Big and resourceful cultivators can make use of it profitably.

6. **Manures** :—Sugarcane is a heavy feeder and responds more to Nitrogen. For stepping up crop yields manuring plays a dominant role. Mukerjee and Varma (1950) have worked out that a 30 tons crop of cane removes from the soil among others, nearly 150 lbs. N. 63 lbs. P_2O_5 and 315 lbs. K_2O. So it is very essential to evolve a suitable manurial schedule for different soil and climatic conditions prevailing in the State with a view to obtain maximum economic yields.

Type 1 :—Green manuring with Sanai plus 50 mds. of F.Y.M. along with 20 lbs. N. as A. sulphate plus mix. of oil cakes and sulphate of Ammonia to give 40 lb. N. in 1:1 ratio as top dressing.

Type 2 :—125 mds. of decomposed factory press mud compost from sulphitation plant at the time of seed bed preparation plus oil cakes to give 30 lbs. N. in mix. with sulphate of Ammonia to give 40 lb. N. half at the time of planting and the rest at top dressing; 3 Mds. of Superphosphate at the time of planting in furrows below the setts.

Type 3 :—250 maunds of F. Y. M. along with 20 lbs. N. as A. sulphate plus oil cakes to give 30 lbs. N. in mix. with 30 lbs. N. as Sulphate of Ammonia half at the time of planting and the rest as top dressing.

7. **Irrigation** :—Sugarcane can be induced to yield heavily in suitable land where rainfall is deficient or badly distributed, but where other climatic factors favour the crop, by the practice of irrigation. Rubert and Fankuer in Punjab estimate that an irrigation about 80″ is necessary for thick canes and 50″-60″ for thin canes. Within certain limits frequent light irrigations are better than fewer irrigations with a larger quantity of water per acre. It should be borne in mind that as growth of cane increases, irrigation should become more plentiful and any shortage of water supply will affect the growth of cane adversely. The moisture content for sugarcane is as high as 80% of the water holding capacity of the soil.

Irrigation is the costliest item in the Eastern districts of the province. Generally irrigation at ten day intervals is sufficient which may therefore vary from 8-12 during the whole period, but the appearance of plants should be the guide.

8. **Cultural operations** :—Generally speaking most of the methods of cultivation now recommended involve the use of improved implements. One of the pre-requisites for lowering the cost of cultivation is the employment of labour saving implements. Hoeing and weeding by manual or interculture by bullocks are quite popular with the cultivators. After every irrigation hoeing and weeding should be done thoroughly once if not twice with Kassi or cultivator or Akola hoe. In about two months from the time of planting, light earthing is done to check the attack of Stem borer. The field should always be kept free from weeds as far as it is possible. After top dressing of manure at the break of monsoons i. e. in the month of July & August interculture by bullock power and earth up with ridge plough. The final finishing is done by human labour. Yield as well as quality of cane are adversely affected on account of lodging of the crop. Tying together the tops of canes in adjacent rows is usually practicised. This is the cheapest and most economic method to save the crop from lodging. Earthing is not essential when the crop is small.

9. **Rotations** :—There should be included some leguminous crops in the common cane rotationes. Economics and

the effect of different rotations on the fertility of soil particularly with reference to the effect of different crops preceding sugarcane on the yield of cane should be understood thoroughly before hand. Some important rotations are given below :—

Eastern Range :-1. Green Manure-Wheat, Green manure-Lahi, Sugarcane, Ratoon. (4 years),
2. G. M.-Wheat, paddy, sugarcane (Oct. sowing) with Gram or Peas, Ratoon (4 years).

Central Range :—1. Ground nut, Arhar, Sugarcane, Ratoon, Green manuring—Wheat.

Western Range :—1. Green manuring—Wheat, Cotton, Methi, Sugarcane, Ratoon.

10. **Other crops with Sugarcane :—**

1. Sugarcane with Gram, Metha, Matar or Lahi (Sept.-Oct. sowing)

2. Sugarcane with Moong, Kakri, or Chari (Feby. sowing)

3. Ground nut, Moong type 1, Arhar (Sugarcane in line sowing).

11. **Diseases and Pests :—**

The tables showing the time of occurrence of some important diseases and pests are given below :—

Diseases

Pre-Monsoon	Monsoon	Post-Monsoon
1. Smut	1. Red rot	1. Wilt
	2. Top rot	2. Rust
	3. Red stripe	
	4. Strincking rot	

Pests

Pre-Monsoon	Monsoon	Post-Monsoon
1. Termites	1. Top borer	1. Top borer
2. Shoot borers (stem & root)	2. Internodal borer	2. Pyrilla
3. Top borer	3. Root borer (minor)	3. Termites
4. Pyrilla (Ratoon & Autumn season crop)	4. Pyrilla	4. Rats
5. Coccids	5. White fly	5. Jackals

Attempt has been made simply to give an idea about the time of occurrence of various important diseases and pests in the State and the control measures will be discussed in the next paper.

Conclusion

The aim of writing this article is to carry the findings of research and field experiences on the cultural aspect of sugarcane to the cultivators who have limited resources at their disposal and those who are resourceful. It is believed that this will help them to get higher and economic yields of cane. The subject of ratooning will, however, be dealt with next time.

METHODS OF GRAIN STORAGE IN MADHYA PRADESH

By : **R. B. EKBOTE & P. K. KAUSHAL**

DUE to the need of carrying over the produce beyond the harvest season, the following indigenous methods came in vogue. These methods are not fool proof but they appear to be the ideal under the conditions obtaining in the villages. The damage to the grain is very small. Till such time as the big ware-house come into being these methods of storage will continue. Among the four methods of storage described below, bundas or under-ground pits, method is by far universal.

1. Storage in bags.

When small lots of different kinds of seeds are to be stored simultaneously and collectively, the storing of grain in bags is generally preferred.

A layer of about 6" of wheat bhusa is spread all over the floor of a store room. Over this wheat bhusa, bags filled with grain and stiched are arranged one over other in a series of rows. About one foot space is left in between the bags and the walls of the room which is filled in with the wheat bhusa. After arranging the rows of required number, these bags are properly covered with the wheat bhusa, about 2' from all sides, to protect them from out-side moist air.

This method is generally adopted when only small quantities of grains are to be stored as it may prove costlier for storing large quantity due to a large number of bags which may be required.

2. Bundas

These are generally used for storing large quantities of grain, mainly wheat. Bundas are round under-ground pits generally dug on high lying portion of the ground in the open. They are about 4½" to 6½" deep with a diameter varying from 12' to 15'. The inner wall of the bunda is plastered with earth or made of bricks plastered with mud. In some cases, cement plastering is also done. The ground floor of a bunda is well plastered with about 3" thick mud. Then after drying, it is plastered with cow-dung.

For storing grain, a layer of about 1' to 1½' of wheat straw (bruised) is spread uniformly at the bottom floor of the bunda This layer of straw is then properly covered with dried teak leaves (*Diospyros melanoxylon* leaves).

Well dried grain is filled in above leaving a space of abeut 9" all round the wall. This blank space is also filled in with wheat straw using teak leaves or mattings of tendu leaves for separating the two layers of grain and straw. This layer of straw is used mainly to protect grain from the dampness in walls or the floor. The bundas are filled up to 4' or 5' above the ground level giving a conical shape at the top supported by bamboo sticks. After filling in the bunda compeletly, the grain is again covered well by the teak leaves or tendu mattings, then about 6" thick layer of wheat straw is spread over it. About 3" thick layer of fine earth is spread above the straw layer pressed well by spraying little water over the earth layer. After pressing, it is plastered with mud and when it is dry it is plastered again with cow-dung. The surface is made quite smooth and even so that rain water should drain off easily. Capacity of a bunda varies from 700 maunds to 1200 maunds of grain according to its size. (A maund is 82 lbs.).

If proper care and precautions are taken to avoid entrance of rain water or dampness inside the bunda from any side there is no possibility of damage to the stored grain. But even with a slightest mistake grain at the bottom or at the top is spoiled and the damage to the grain varies from 2 to 3%.

3. Dholies Or Palai

This is a local term given to bins made of bamboos. These are some what square at the top. The dimension of such bamboo bins varies according to individual needs. These are used for storing small quantities of grain, usually varying from 10 to 15 maunds. The diameters of a 14 maunds capacity bamboo bin is as given below :-

Bottom diameter	- 3½'
Centre girth	- 9'
Diameter at the top	- 2'
Height	- 4½'

A newly prepared (bamboo bin) dholi is plastered on all sides with a mixture of cow-dung and mud. After completely drying for two or three days it is again plastered with cow-dung alone and then dried. The main idea of plastering the dholi is to make it completely air tight.

When they are completely dry, the dholies are kept in a room where the grain is to be stored. Thoroughly dried grain is then filled in leaving about 6" space from the top empty. The grain is then covered with teak leaves over which a layer of wheat straw is given up to the top of the dholi. Mouth of the dholi is closed with mud thus making the dholi completely air tight. If proper care is taken in filling the grain and the dholi is made completely air tight, there is the least possibility of damage to the grain by stored grain pests.

4. Iron Bins.

Iron bins of various sizes are now used by big landlords or advanced cultivators. The bins are made of Galvanised Iron sheets. They are of various sizes varying from 3′ to 4′ in diameter and 6′ to 7′ in height. They are also provided with cover lids. The capacity of bins varies from 30 to 45 maunds.

For storing seed, the bins are kept in sun for 3 to 4 days, cleaned thoroughly and dusted inside with some strong insecticide to destroy any possible insects or their eggs. The bins are then arranged in a godown room and the dried grain is filled in, leaving about half-foot empty space from the top. The empty space is filled in with wheat straw and the bins are closed with their lids and sealed so as to make completely air-tight with mud plaster to protect against moist air during rainy season.

Iron bins are very rare in use due to their high initial cost.

BUILDING VILLAGE ROADS -- A CRYING NEED OF OUR RURAL ECONOMY.

By: **GRAM SEVAK**

THE importance of means of transport in a developing economy need not be emphasised, since the two are inseparably linked up. Rural roads came to be given due attention as early as the Nagpur Plan (1943), which among its many proposals had also proposed that in 20 years time all important rural areas should be connected with a high-way and no village in a well-developed agricultural area should be more than five miles away from a high-way.

Under the First Plan the importance of the development of rural roads was recognised and as a token of the Central Government's interest in the development of the village roads the Roads Organisation had formulated a programme of rural road development on a co-operative basis and a provision had been made for grants out of Central Road Fund Reserve for specific projects. Besides this programme a tentative estimate was also made that about 16,000 to 17,000 miles of kutcha road would be constructed in village units falling under the programme of Community Development Projects.

In the Second Plan also the village roads have been taken into consideration and it is proposed that their development will be undertaken on an expanded scale in the National Extension areas, but due to certain difficulties no definite targets of mileage were fixed.

Why development of village Roads?

Any one who happens to be familiar with rural surroundings very well knows

why rural roads should be given so much importance. Notwithstanding various developmental activities undertaken uptil now there are still lakhs of villages which continue in a state of complete negligence and seclusion. The people in these villages have no schools, libraries, newspapers, markets, hosp-tals, post offices or other such amenities which in a civilized world of today have become indispensable for human beings. Their contacts with the outside world are very limited and inspite of all the developments they still live as they did centuries back. Sometimes one has to walk on foot 10 to 15 miles through fields and bushes to reach a village from a railway station or highway. They depend mostly on the local resources which nature provides them, which is a reflection not of self-sufficiency, as some would say, but in fact their helplessness due to absence of transport facilities that could enable them to move out to neighbouring towns for purchasing their requirements.

Most of the villages do not have even a kutcha road on which ekkas, tongas, or carts can run; the only route being the narrow boundaries of the fields on which they walk barefooted for miles and miles together under scorching sun, always exposed to the danger of being robbed or injured by some wild animals. This is no exaggeration but a fact of everyday life in the rural areas. During the rainy part of the year the problem of rural transport assumes a very serious form. The rains accumulate in the surrounding fields to a depth of two to three feet, sometimes even more. Some villages are entirely separated from the rest of the world. In such cases the villagers are faced with considerable difficulties so far as fodder for cattle is concerned or when some emergency compels them to go to neighbouring towns.

In view of the above mentioned difficulties development of village roads becomes an urgent necessity and requires much more emphasis than what it has been given so far. The Nagpur Plan's recommendation that no village after 20 years should be situated more than 5 miles off a main road can be made more conducive to rural prosperity, if we also plan to connect each village to the highway through kutcha roads suitable for vehicles like tongas, ekkas, rikshaws, cycles and bullock carts all the year round. Now time has come when planners begin paying major attention to villages which are the soul of India. A very important advantage of the whole village road construction and development programme would be expanded employment opportunities for the village folk who are hard-pressed with chronic under-employment and unemployment. With the development of roads in each and every village thousands of people will be absorbed in various vehicle driving occupations. With increasing vogue of ekkas, tongas and rickshaws etc., in the rural areas number of subsidiary cottage and small industries will also crop up for manufacturing and repairing of these vehicles. Where traffic is heavier Government buses can be run in addition to the above mentioned vehicles.

It is true that with the construction of these roads several acres of culturable land will be covered under them but the road development will increase the productivity of the peasants, by facilitating intensive cultivation. It will also enable the peasants to sell their products directly in the mandis at somewhat higher prices than what they receive from local Banias. Then if the scheme for land reclamation is also intensified simultaneously the reduction in the cultivable land area due to road construction can be more than made up. The

development of rural roads will lead to rural uplift in its various spheres, economic, social, cultural, political and educational.

6. Our experience of the co-operative spirit of our village folk, they evinced during the 1st Plan is highly encouraging. They constructed 6029 miles of metalled and 38000 miles of unmetalled roads, under the Community Development and N.E.S. schemes, entirely on a voluntary basis. This was in addition to improving 22000 miles of existing roads.

Our village folks have inexhaustible capacity to work. What is needed is creation of a suitable atmosphere to harness this vast resource of human labour into constructional activities. They are ready to co-operate in the noble task of nation building but when this co-operation means some sort of payment from their pockets they hesitate and ultimately withdraw because of their grinding poverty. Therefore, in this great co-operative effort Governmet has to play a major role. It should allocate funds to each and every village unit for road building and provide as far as possible necessary equipments. Our village labour force will voluntarily come forth to fulfil manpower requirements and in a few years a crying need of our rural, and hence national economy will be satisfied.

CO-OPERATION ON THE LAND

How The Movement Helps Farmers In Britain

By : **J. A. B. HAMILTON**

THE multi-purpose farmers' co-operative societies in Britain can supply farmers with feeding stuffs, fertilisers, equipment and much else, and purchase their eggs, poultry and grain ; in fact the largest societies are able to supply practically everything required on the farm.

Nothing of the kind was foreseen when the farmers' co-operative movement started in the latter part of the last century. It started with a few small societies for the purchase of feeding stuffs and fertilisers. Their primary object was to protect the farmer against the excessive prices charged by merchants, but instead of separate organisations being formed for each purpose, as has happened in most other countries, these societies gradually began to purchase first one essential for the farmers' needs, then another. Thus the multi-purpose society came into existence.

The movement made no great headway until after the end of World War II, but since then it has been going ahead fast. The effect has always been to bring down prices–known to be higher in parts of the country where no society exists. It thus benefits all farmers in the locality, whether they are members or not, while members derive the further benefit of sharing the profits in the form of a bonus on the amount of business done.

A Typical Society

A large society may have a turnover of anything from £ 2,000,000 to £ 8,000,000, of which about three-quarters will come from farm requisites. The members will number from 3,000 to 10,000, but with the tolerance which seems inherent in the British character, the society will also do a large business with non-members. On the whole, it will be strongest in areas where most of the farms are medium-sized or small.

Let us take a typical large society, with some 20 depots serving an area of about 4,000 square miles. Each depot holds large stocks of animal foods, but much of this goes in lorryloads direct from the mill to the member's farm. The society has several mills for grinding its own mixtures, but it also sells those manufactured by outside firms, as some farmers prefer these.

Each branch has a sundries department, which sells rakes, brooms, wire-netting, binder twine, gumboots, paint, troughs, ladders, poultry-houses, to mention only a few items. These are delivered in the society's lorries along with the feeding stuffs.

Members may visit the depot and give their orders personally, or telephone if they are in a hurry. More often they will order from the travelling salesman, who calls once a fortnight. Most members will buy the bulk of their requirements from the society, but they often like to deal with a private merchant as well, in order to encourage competition.

Machinery And Building

The machinery department is organized in a separate series of branches, which undertake all kinds of repairs, either in the workshop or out on the farm.

The society maintains a building department, which undertakes all kinds of farm repairs and installations, such as laying water-pipes or fitting up the buildings with electricity. Other services include spreading lime and the spraying of crops against pests and weeds. For farmers who prefer to do their own spraying, the society supplies both the outfit and the liquid.

Another department sells tractor fuels —petrol, paraffin and diesel oil. The society does this as agent to one of the large distributors, who have found that their sales to farmers have nearly doubled since they deputed the business to the society. For one thing, the society gives much prompter deliveries than any rival distributor, and a farmer who runs short knows that he need only telephone to be sure of a further supply within 24 hours at most.

All goods and services, as well as sales to this society, qualify for member's bonus, which for some years has been at the rate of eightpence in the £-nearly $3\frac{1}{2}$ per cent.

Purchasing and Insurance

The Society maintains a buying department which will purchase grain from members, often for sale to other members, especially in the case of barley. The egg packing station handles about 50,000,000 eggs a year-most of the eggs in the district.

To help farmers with egg and poultry production, a full-time expert is maintained, who visits farms to advise on housing, feeds, hygiene, laying strains, incubation and all poultry problems. The service is available without charge to members and non-members alike, and, apart from the value of the advice given, it has had a useful effect in building up goodwill.

Two final examples will show the variety of the society's operations. Its insurance department enables members to insure their buildings, machinery and livestock against mishap of all sorts, while the veterinary shop sells every kind of medicine likely to be required by livestock. The chemist in charge is not a qualified veterinary surgeon and cannot therefore give treatment, but his visits have given many farmers a better understanding of how to look after their livestock. He also makes up his own mixtures much more cheaply than many proprietary brands, and these benefits, coupled with the fact that members can draw a bonus on all veterinary purchases, are the main advantages which the shop has brought.